VOL. 6. No. 4. JULY, 1896.

THE MONIST

A QUARTERLY MAGAZINE.

Editor: DR. PAUL CARUS. *Associates:* { EDWARD C. HEGELER. MARY CARUS.

CONTENTS:

PAGE

THE HOLINESS OF INSTINCT.
PROF. WOODS HUTCHINSON - - - - - - - - 481

PHILOSOPHICAL TERMINOLOGY AND ITS HISTORY.
PROF. RUDOLF EUCKEN - - - - - - - - - 497

ON THE ORIGIN AND IMPORT OF THE IDEA OF CAUSALITY.
PROF. FR. JODL - - - - - - - - - - - - 516

SCIENCE AND FAITH. II. Introduction to Man as a Member of Society.
DR. PAUL TOPINARD - - - - - - - - - - 534

THE PROBLEM OF GOOD AND EVIL.
EDITOR - - - - - - - - - - - - - - - 580

LITERARY CORRESPONDENCE. France.
LUCIEN ARRÉAT - - - - - - - - - - - - 600

BOOK REVIEWS - - - - - - - - - - - - - - - - 608

Hermann von Helmholtz's Untersuchungen über die Grundlagen der Mathematik und Mechanik. By *Dr. Leo Koenigsberger*, p. 608.—Die Ueberwindung des wissenschaftlichen Materialismus. By *Wilhelm Ostwald*, p. 610.—Die Ausdehnungslehre von 1862. By *Hermann Grassmann*, p. 612.—Tractatus de Intellectus Emendatione. By *Benedict de Spinoza*, p. 617.—On Germinal Selection. By *August Weismann*, p. 618.—Inductive Logic. By *Wm. G. Ballantine*, p. 619.—Buddhism in Translations. By *Henry Clarke Warren*, p. 620.—Bhakti Sataka. By *Râma Chandrabharati*, p. 624.—The Literary Study of the Bible. By *Richard G. Moulton*, p. 625.—The Modern Reader's Bible. Edited by *Richard G. Moulton*, p. 625.—The United States of America. By *Edward Channing*, p. 628.—Grundriss der Psychologie. By *W. Wundt*, p. 632.—On Memory and the Specific Energies of the Nervous System. By *Ewald Hering*, p. 634.—L'Année Psychologique. Publiée par MM. H. Beaunis et A. Binet, p. 634.—The Psychological Index, No. 2.—Princeton Contributions to Psychology, p. 635.—Studies from the Yale Psychological Laboratory, Edited by *Edward W. Scripture*, p. 635.—An Examination of Weismannism. By *George John Romanes*, p. 635.—Studies in the Psychology of Religious Phenomena. By *James H. Leuba*, p. 636.—Endokannibalismus. By *Rudolf Steinmetz*, p. 636.—Die Denkschöpfung umgebender Welt aus kosmogonischen Vorstellungen in Cultur und Uncultur. By *A. Bastian*, p. 636.—Die Lehre von den spezifischen Sinnesenergien.—Wirklichkeitsstandpunkt. By *Rudolf Weinmann*, p. 637.

ERRATUM - - - - - - - - - - - - - - - - 637

PERIODICALS - - - - - - - - - - - - - - - - - - 638

The Psychological Review, p. 638.—The American Journal of Psychology, p. 638.—The Philosophical Review, p. 638.—Mind. New Series, p. 638.—Revue Philosophique, p. 638.—Revue de Métaphysique et de Morale, p. 639.—Zeitschrift für Psychologie und Physiologie der Sinnesorgane, p. 639.—Archiv für systematische Philosophie, p. 640.—Vierteljahrsschrift für wissenschaftliche Philosophie, p. 640.—Kantstudien, p. 640.

CHICAGO:
THE OPEN COURT PUBLISHING COMPANY.
1896.

COPYRIGHT BY

THE OPEN COURT PUBLISHING CO.

1896.

VOL. VI. JULY, 1896. No. 4.

THE MONIST.

THE HOLINESS OF INSTINCT.

I.

THE soul of man has commonly been regarded as the battle-ground of two opposing influences. These have been often conceived as extrinsic, namely, angels and demons, Evil and Good; but more frequently as intrinsic and inherent, as elevating impulses upon the one hand, against degrading on the other; soul against body, immortal against mortal.

The latter views fall mainly into two great classes, one in which both conflicting forces are regarded as equally immanent and indigenous; the other, in which the higher or spiritual contestant is regarded as acquired or imported at comparatively late stages of development,—"breathed in," as its name implies, by some superhuman power. According to the former view, the nobler impulses of man's nature are proofs of his fall from a higher estate—remains of an Edenic condition of purity; traces of a lost innocence and holiness. This is the view of the Old Testament theology, and has probably found its highest and most beautiful expression in Wordsworth's familiar ode "On Recollections of Immortality."

> "Trailing clouds of glory, we do come from God, who is our home."

The other, which is that of the New Testament, and of the Fathers and dogmatic theologians generally, is that of the two warring elements one is primitive, carnal, animal, sinful, while the other is secondary, spiritual, ethereal, holy. For example, Paul declares: "I know that in me, that is in my flesh, dwelleth no good

thing"; urges us to "mortify the flesh with the affections and lusts," and cries out in despair: "Who shall deliver me from this dead body" (literally, "body of death"). And not only Christian theologians, but Buddhist monks, philosophers of all creeds and of no creeds, poets, mystics, dreamers of every sort and age, have revelled in it and re-echoed it until it has become a part of the household furniture of the thought of the world.

The twofold constitution of man's nature, from a mere figure of speech has come to be regarded as a literal, material fact.

The higher part, generally known as the soul, is properly assumed to have become joined with the lower part or body, much as a flower-seed might have taken root in a patch of soil. It is admitted that they are absolutely dependent upon one another, the soul for its existence, the body for its graces, and not a scrap of ponderable evidence can be adduced of the possibility of the existence of either apart from the other, and yet in flat contradiction of every other similar instance in nature, the bitterest enmity is supposed to exist between them. The impulses of the body are, above all things, to be distrusted, repressed, and dreaded by the soul. "Whatever is flesh is sin," while the aspirations of the soul are equally certain to be opposed, thwarted, and, if possible, brought to naught by the body. "The mind of the flesh is enmity against God." The most favorable view that we are permitted to take of the body is that it is a slow, stupid, extremely exasperating, but useful servant; a necessary evil which must be tolerated and even humored to some extent, because it would be difficult to get along entirely without it. This was the feeling of the monk Francis d'Assisi, who, though so full of love for all others of God's creatures that he actually conceived and carried out the beautiful idea of formally preaching the Gospel to the birds and the fishes on the lake-shore, could only find it in his heart to say of his own body, when told that it had been so weakened by fastings and vigils as to be hopelessly diseased, "I have sinned against my brother, the ass."

But even this amount of contemptuous toleration is rare. More commonly the body is described and regarded as "a dull clod," a

"house of clay," a "sepulchre," a prison against the bars of which the imprisoned soul beats its wounded pinions until Death comes to its release. All of which is about as reasonable as if a buttercup should revile the soil which hung about its roots and forcibly prevented it from floating off across the meadow-lands with every zephyr that blew. The soil has not only produced the buttercup, but will produce, after it has passed away, thousands of nobler, grander forms than anything its shallow, little, golden pate could even conceive of. Even so the body-stuff of these ecstatic dreamers has not only produced them, dreams and all, (though how much to its own credit is to be doubted,) but has within itself grander and lovelier possibilities than even the loftiest imaginings can depict, to say nothing of the morbid, childish phantasmagoria which form the bulk of such "visions":

"Eye hath not seen, nor ear heard, neither hath it entered into heart of man to conceive the things which God hath prepared for them that love him."

But the truly "spiritually-minded" of all creeds do not stop even here. It is not enough for them to regard the body as a mere clog upon the flight of the soul, a passive hindrance to spiritual progress, but they openly declare war upon it as their soul's bitterest enemy, and as something actually sinful in itself, a creature so degraded and so essentially vicious, that to deprive it of its comforts, thwart its impulses, nay, even torture it and refuse to supply its simplest wants, becomes positively meritorious. The renunciation (in plain English, cowardly desertion) of wife and children, parents,—in short, of all family and social ties, the abstaining from food, from drink, from shelter and warmth, scourging the back with chains until the blood comes, cutting the feet into ribbons by barefoot pilgrimages over stony roads, lying stark naked upon icy pavements all night long, and even such well-nigh ludicrous "mortifications" as wearing hair shirts, walking with peas in one's shoes, refusing to wash, comb the hair, change the clothing, have been accepted as deeds of saintly odor. In fact, the principle appears to be that the more a man can humiliate and torture his body, the more he will glorify and please the God who made it.

To such an extreme has it been carried, that not only are the selfish appetites and impulses of the body to be repressed, but even its kindly, altruistic ones. Paul commands us to "mortify the flesh, with the *affections*" as well as the lusts thereof; and even in our own century grave and learned theologians, after much deliberation, have decided that "natural goodness" and the "graces of nature" are sins in the sight of God, and even deeds of righteousness by the unregenerate will be counted against them as sins in the great day of judgment. To say that such utter antagonism between plant and soil, egg and nest, fish and water, child and mother, is not only absolutely unparalleled but flatly contradictory to everything else in nature, would be simply waste of breath, for we should be promptly informed that we were "no longer under nature, but under grace." Fortunately the retort, "Deliver us from such grace," though instinctive, is unnecessary, for the remorseless logic of events has already accomplished this. Wherever this belief has gone, it has written its progress in letters of blood. Its true nature stands revealed, in the filthy, degrading hermit-craze, in the black plague of monasticism, with its fever fits, the inquisition, Jesuitism, St. Bartholomew's Eve, and "religious" murders and persecutions of every description, and has left a broad, black, shameful brand across the pages of European history, which has come perilously near stamping a bar-sinister across the escutcheon of Christianity.

By experience utterly discredited, practically dead, it survives only in the formal theology of the modern church, though, fortunately, like many of its associates there, it has become pure theory which every one believes, but no one dreams of living up to.

The dual conception of man's nature, with its conflict between two great opposing forces, is strikingly similar to that which is held in regard to the world about us. And like it, will, I think, be found upon closer study, to be based upon a misunderstanding, a judging from appearances, without investigating the real nature of the phenomena.

When we come to weigh the question systematically "which is the greater," good or evil, passion or virtue, love or selfishness, we are promptly driven to the unexpected and even unwelcome con-

clusion that there is no ground for debating the question, as absolutely all of these "opposites" are found to be merely varying intensities under different circumstances of one and the same set of impulses. Passion is but blameless, healthful appetite run riot. Hatred is but righteous resentment become morbid. Envy is a jaundiced desire to excel.

When it comes to specific deeds and actual instances, the essential identity becomes even more obvious. The fault of gluttony, for instance, does not lie in the impulse to eat, for that is one of the great primal appetites, without which the race would soon cease to exist. Nor in the kind of food consumed, for that may be both wholesome and nutritious; nor in the absolute amount, for that might be easily digested by a more vigorous or needy individual, but simply in the relative excess, the failure to control an originally beneficent impulse.

The crime of theft consists, not in the impulse to appropriate, for that is thrifty as applied to material objects, and saintly as directed to spiritual graces; not in the nature of the thing appropriated, nor in the position, size, or color; not even in the uses to which it is to be put, or its usefulness or uselessness to the acquirer. A man may take anything, of any value, by any means, without becoming a thief, providing that he does not know or reasonably conjecture that it belongs to some one else. He has a right to anything that he can lift, providing no one else has a prior claim. His liberty in this respect leaves off only where some one else's begins. The crime lies solely in an actual or possible injury to somebody else, a failure to balance self-love by love of one's neighbor. Adultery and fornication are indulgences of the great sexual or race-continuing instinct under unlawful conditions, in other words, under conditions which experience has shown to be injurious instead of beneficial to the race. Even the crime of crimes, murder, which with its horrid front and gory locks almost appears to have a demon-like existence of its own, an essential, self-evident atrocity, consists not in taking the life of a fellow-being, for this is justifiable,—nay, even at times commendable, in war, in defence of country or loved ones, as an officer of the law, to protect the rights and property of

others, even in the defence of one's own life,—nor in the time, manner, or circumstances of the deed, but solely in the destruction of another's life and happiness for inadequate, selfish, or malicious reasons.

In short, the "principle" of every sin that can be mentioned, except lying, is a natural, beneficent instinct. Crime is simply lack of control. Right and wrong are broadly considered purely relative terms.

Absolutely no impulse is primarily and essentially evil or sinful, though any may become so, if uncontrolled. No action is *of itself* wrong,—the circumstances under which it takes place alone determine its moral quality. This statement will appear like a truism to all who have calmly considered the question, but its converse may not be quite so readily accepted, though equally true and important, viz., that there is no impulse so high or holy that it may not, if followed to an extreme, become both degrading and sinful, and no action so beneficent or so saintly that it may not under certain circumstances be both harmful and immoral.

Take, for instance, the noble instinct of parental affection, the purest and most unselfish flame which burns in these earthen lamps of ours, a grace which blesses alike the possessor and the receiver —the very corner-stone of morality; and yet the relentless ferocity of the tigress who has cubs, the tragedies of Lear and Père Goriot, and the hundreds of humbler instances, familiar to us all, of spoiled sons and petted daughters who have been utterly ruined and brought shame and bitterness upon their families, solely from the unreasoning devotion and blind indulgence of a fond mother or doting father, would at once suggest themselves as illustrations of how even the most sacred affection, in excess, may become immoral.

The injustice which affection may work to those outside of its scope, and the corruption even, which it will introduce into public life, have been epitomised in one word, "Nepotism."

Again, take the religious impulse,—the instinct of worship, the adoration of the mystery of the universe. It is a feeling inspiring in itself and ennobling in its tendencies. It has covered the world with its prayers in stone, the noblest architectural achievements of

the race, its temples, its shrines, its mosques, its cathedrals. It has been the nurse of poetry, painting, and literature, and the very mother of music. But when the student of history turns to the reverse of its medal of honor, and reads its deeply-cut record of persecutions and penances, of wars and of massacres, of crusades and inquisitions, of burnings and torturings, of fanaticism, intolerance, and oppression, he is driven to admit that even this lofty impulse uncontrolled, rapidly becomes a hurtful and degrading one.

Indeed, the line is so easily crossed that he is in sad doubt at times which side of the medal should be hung outward.

Even our sense of duty, our enthusiasm for the right, which is supposed to be our most nearly divine attribute and to lift us furthest above the brute, is capable of sad perversion. It has inspired some of the noblest characters and grandest actions of history, and would appear to be the one safe and absolutely trustworthy guide for humanity. "Only follow this," we are assured by philosophers, prophets, and priests of all creeds, "and all will be well." It is probably the safest single guide, but there is not a folly or a crime into which blind and unreasoning obedience to it has not led.

It is a sense of duty which leads the Brahman widow to cast herself upon the funeral pyre of her husband. It was a sense of duty which drove the best of the later Roman emperors to persecute the early Church, that inspired the obliquities and atrocities of Ignatius Loyola, that impelled Calvin to burn Servetus, and urged the Puritan to banish and hang the Quaker, and burn and torture helpless old women. Indeed, the "higher" and more "spiritual" an impulse, the more capable of perversion it would seem, if not constantly checked by our "lower" but kindlier and healthier instinct and affections. If it were not for the vigorous and incessant opposition of our bodily tendencies, our spiritual ones would precious soon exterminate the race.

Which are really the "higher"? Morality, like sanity, is everywhere and always a question of balance, of control, of moderation.

Love of self impels us forward until we are checked or deflected by the other great natural instinct, second only to it in power, love of others, beginning with love of offspring and extending and broad-

ening to love of the family-circle, the clan, the nation, the race. For every passion nature has provided an affection as a counter-check; for every spring of action, a balance-wheel. Nay, more, if one passion becomes overbearing, all the others unite to oppose it. The path of Goodness, Sweetness, and Light is most surely reached and best followed, not by the deification of any one of our impulses and tendencies, but by an intelligent and reverent balancing of the promptings of all. That the resulting motion will always be in the right direction, is the Faith of those who believe in evolution.

This brings us to the question of the source and origin of what we are pleased to term our moral sense, those instincts which influence our conduct with regard to the rights and feelings of others rather than to our own, our altruistic impulses, the "sense in us for conduct," as Matthew Arnold terms it; and here is where the ray of the Fifth Gospel becomes far brighter and more cheering than that of the Fourth.

The position of St. John is a perfectly simple one. Conscience is the direct voice of God, "the Light that lighteth every man,"—a principle far above and utterly different from anything which would possibly have developed out of poor, sinful, selfish human nature. It is to over-ride, not only the passions, but also the affections and sympathies of humanity; nay, more, that all these are utterly contrary to and in opposition to it. "Whoso hateth not father or mother, for my sake, is not worthy of me." "Whosoever forsaketh father, or mother, or wife, or children, for my sake and the Gospel's shall receive . . . Eternal Life." Every natural instinct is thus practically placed upon the side of Wrong, and Right can only be saved from defeat by the continual interposition of the Deity. Human nature, which this Deity is supposed to have created in his own image, is not to be trusted for a moment. With such a view, is it any wonder that it has been a "religion of suffering," of sadness, and of despondency. "Narrow is the gate and strait is the way that leadeth unto Life, and few there be that find it." "For if the righteous scarcely be saved, where shall the sinner and ungodly appear?"

On the other hand, we have the "utilitarian" theory of Spen-

cer, the "greatest happiness" theory of Mill, the "refined selfishness" one of Bentham, all of which derive this exquisite faculty from the purely selfish impulses of man's nature. It is an enlightened self-interest, modified by experience, in fact. And I regret to say that modern evangelical Christianity has practically swung round to the same ground, inasmuch as the main incentive to right-doing which it urges, is the hope of escaping hell or gaining heaven.

Compare all of these with the view "from a natural standpoint," developed by the Master in his immortal chapter on the moral sense in *The Descent of Man.* Here is absolutely the only conception which does not compel us to regard it as either beginning or ending in pure selfishness. How much more noble, satisfying, and adequate it is can only be appreciated on careful study and comparison with the others. The source of morality is seen to be in the social instincts and sympathies which are derived, not from tempered greediness or chastened self-interest, which has been whipped within the bounds of decency by repeated bitter experiences, but directly from the warm, beautiful, and unselfish family affections. Here is a source and a sanction as truly divine as anything imagined by John. And, best of all, it is nothing foreign or hostile to the rest of our nature, but, on the contrary, a part of it. Every other faculty of our being subordinates itself to it, and shares and glories in its triumph. So far from the lower instincts being hopelessly at war with and anxious to destroy the higher, they are their originators and faithful friends, so faithful, that in many cases they save the latter from its own excesses. There is no "crucifying" to be done, for we could not possibly afford to dispense with either. The impulses of the "flesh" within their proper limits, are seen to be just as holy as those of the "Spirit."

The love of the mother for her babe, of the boy for his careworn mother, of the husband for his sweeter self, are as divine as the devotion of the saint and the self-denial of the anchorite, and infinitely more beautiful and wholesome. No tendency can be condemned simply by calling it human; not even by stigmatising it as animal, for these beautiful, natural graces are by no means confined to the human family.

We sometimes forget that the affections and embryo moral instincts are just as truly "animal" as are the passions and lusts. Humanity can boast of no nobler, truer emotions than the love of the doe for her fawn, or the dove for her nestlings, the reckless bravery of the bear in defence of her cubs, or the partridge in protecting her young, the fidelity of the lory to his mate, or the dog to his master.

Call the muster-roll of our virtues, and see how many of them have their origin outside the human family. What superiority dare we claim over the "brutes," the birds, the bees, the ants, in courage, in perseverance, in affection, in industry, in devotion, in patient endurance.

The pedigree of two-thirds of our virtues is far longer than the human race. They are backed by the inheritance, not merely of our whole human lineage, but by that of our infinitely longer prehuman ancestry. Their strength is drawn from the life of all the ages.

Call the roll of our vices, and see how the case stands with them. Here is the list of Paul, who was a connoisseur in such matters, judging from the number he has tabulated: "Fornication, uncleanness, lasciviousness, idolatry, sorcery, enmities, strife, jealousies, wraths, factions, divisions, heresies, envyings, drunkenness, revellings."

If for the first of these we read, as was probably intended, "prostitution," and omit such as are obviously repetitions, namely, "strife," "wraths," "divisions," "envyings," and "revellings," out of the ten that remain only three can fairly be claimed to be of animal origin,—lasciviousness, enmities, jealousies. The others are purely human accomplishments.

No animal has yet been found guilty of prostitution for hire, of drunkenness, nor for obvious reasons, of idolatry, sorcery, heresy (or the burning of the holders thereof), of factions, of hate, of gambling, of lying, of commercial swindling, and only a few of them have "risen" to the dignity of wife-beating, of cruelty to children, or of slavery.

Take it altogether, our animal ancestors have quite as good reason to be ashamed of us as we of them. Indeed, it would almost seem as if one of the most common uses that man had made of the elevation he had attained had been to fall from it. Certainly the "higher" an impulse is, the more distressing the perversion of which it is capable. "Lilies that fester smell far worse than weeds."

The cheering thing about it is that the pedigree of two-thirds of our vices is of mushroom length; that of our virtues reaches back through all the ages. Our virtues are older than we are.

What then is the true value of instinct as a guide? Of the very highest, popular impression and ecclesiastical teaching to the contrary notwithstanding. Instinct is the crystallised experience of thousands of generations. It is the golden seed-wheat chosen of a million harvests and a myriad threshing-floors. It ranks lower than reason because less of individual volition or judgment enters into it; but as a guide it is far safer, as a spring of action far more reliable and effective, and so far as it goes, has no superior. Our life-long struggle to form "good habits," as we say, is merely an effort to change rational preferences into instincts.

The beauty, the accuracy, and the beneficence of the instincts of the lower form of life have been the marvel and the admiration of every observer and philosopher,—nay, even of theologians. Out of a thousand instances we need merely suggest the architectural instincts of bees and ants, the migratory of birds and fishes, and the chrysallis-making one of grubs. But it is calmly assumed that in our own species alone they have utterly lost their force and value. Our pride would not permit us to depend upon or even recognise them, lest we should seem to admit our kinship to "mere brutes." Fortunately for us, they still remain with us in spite of our haughty refusal to officially recognise them, and control two-thirds of our actions; and it would be to our credit and benefit every way if they controlled the majority of the remainder. Every time we neglect them we suffer. It is, of course, hardly necessary to remind you that the great mass of our most important vital movements, such as breathing, swallowing, suckling, eating, drinking, walking, etc., would be impossible without them, but beyond all this, whenever

we can find an instinct to follow, it is safe to do so nine times out of ten, even under civilised conditions.

Ask any intelligent physician, and he will tell you that if civilised man would only follow his instincts in respect to fresh air, sunlight, exercise, food, water, bathing, etc., he would be far healthier, happier, yes, and more moral than he is. Our dyspeptic race would be better in every way, for a greater indulgence in "the pleasures of the table" (including *at least* twenty-two minutes for dinner), for more cat-like basking in the sun, for a good deal more "barbaric indolence," for more rebellion against the fiendish old Puritanic saw, that "Satan finds some mischief still for idle hands to do," for a more frequent giving way to the impulse to fling the yard-stick out of the window, and the ledger under the desk, and away to the woods, the fields, and the mountains; if the grown man would run away and "go swimmin'" as the boy does.

An excellent illustration is the case of intoxicants and narcotics. Did any one ever hear of a baby with an instinct for whiskey, or a child who enjoyed the taste of tobacco or the smell of a cigar? Tongue, nose, and stomach unite in their disapproval of all three, as the comic horror's of a boy's first smoke, and the racking headache of the freshman's spree abundantly testify. It is only by systematic and repeated repression of instinct by "reason" and "higher intelligence" that either of these habits is formed; yet we have the colossal impudence to say that a man who is reeling drunk has "made *a beast* of himself"!

And this is by no means an exceptional instance; indeed, it would not be too much to say that two-thirds of the diseases of civilisation are due to the neglect or deliberate repression of some instinct.

However valuable the instincts may be admitted to be in health, the almost universal impression is in both popular and professional circles that they are just the reverse in disease. The sick man is popularly supposed to want just those things he ought not to have, and to dislike just those things which are "good for him." And, indeed, altogether too much of both household and professional medical treatment was originally constructed on that very principle.

Its principal reliance was placed upon "bitters" of all kinds, the nastier the better, purges, emetics, asafœtida, blisterings, bleeding, starving,—in fact, the more disagreeable a drug or process, the more violent its effects, the greater its curative power was supposed to be. Even at this day a "medicine" must be bitter or it isn't much thought of by the patient, and a "hygienic dietary" is usually constructed simply by forbidding everything that the invalid has any liking for.

The simple truth of the matter is, unflattering as it may be to our professional pride, that even up to the middle of the present century the old demon-theory of disease had far too much influence over our therapeutics. Disease was still regarded as an entity which must be driven out of the body of the patient by more or less violent or repulsive means. This distrust of the instincts in disease is not medical, but priestly. The wonderful "progress of modern medicine" has consisted very largely in getting rid of this idea. Wounds, for instance, instead of being poured full of wine, or oil, or turpentine, or other irritating substances, or burned with hot irons, or kept gaping for weeks, "to establish suppuration," or dressed with earth, cobwebs, pitch, or even excrement, are now simply thoroughly cleansed, closed as accurately as possible, and protected by the softest and lightest of dressings. In short, we simply follow our natural impulses, imitate the lower animals, and the result is that our mortality rates, after both accidents and operations, are reduced fifty, sixty, and even eighty per cent.

In fevers, for instance, the parched and gasping patient, instead of being swathed up to his neck in blankets, kept in carefully heated and darkened rooms, with doors and windows religiously closed, forbidden cold water, or indeed cool drinks of any kind, as if they were deadly poison, and systematically starved upon a "fever regimen" of slops and washes of every description, is now placed between the coolest of sheets, and with the lightest of covering, in cool, breezy, sunshiny rooms, systematically fed with the most nourishing and digestible of foods, given all the water and fruit-juice he can possibly drink, not only bathed, but even put to soak in cold water.

Our most modern and most successful treatment of typhoid fever consists merely of a liberal milk-diet, encouraging the patient to drink at least a gallon of water a day, and plunging him into a cool bath whenever his temperature rises above a certain point. Again, we simply respond to the demands of poor, hot, thirsty nature; and by so doing have lowered the death-rate from sixteen per cent. to less than five per cent.

The value of instinct as a guide in morals is equally great, although there is here a certain amount of conflict between the individual or selfish instincts, and the social or altruistic ones. And, although it is true that the intensity of our necessary vital desires or appetites is ofttimes so great as to cause us to disregard the rights of others in their gratification, and thus violate our higher or social instincts, to sin, in theological language, yet it is also true, as beautifully pointed out by the Master, that the former are essentially temporary in their duration, and capable of but feeble recollections, while the latter are absolutely ceaseless in their action and produce by their violation lasting sensations, such as shame, remorse, loss of respect, feeling of isolation, etc., which become more vivid with each successive recollection. In fact, the higher instincts, though at the time feebler, are in the long run more than a match for the lower. It would be strange indeed if these instincts, which have *created* morals, were not still to be trusted in their domain.

What, then, is our final conclusion? That morality is natural, and instinct the holiest impulse that stirs man's bosom. Truth is mighty, and sweetness and light are winning qualities (in more senses than one). Morality has won its pre-eminence by "the right of the strongest," and has no need of assistance or protection from revelation, church, priestcraft, or state. Still less does it owe its origin or continuance to any of them. And yet almost every religion, every priestly order arrogates to itself the position of the true originator and only conservator of morality. Heaven forbid that it should rest on any such narrow and shifting foundation. Beautiful and inspiring as the spirit of worship is, and valuable and powerful as its influence, morality depends upon no one emotion or influence, but upon all the forces and pulses of nature. All the warmth of

man's nature, all the courage, the beauty, the vigor, of animal life, nay, even the beauty of the meadows, the sweep of the rolling tide, and the glory of the dawn, are in it and behind it.

Cut it off from the influence of any one of these, and it goes halting at once. Confide it to any one of these alone, and it withers and all but disappears. Even the religious instinct, for instance, must be balanced by the affections, the necessary appetites, the common sense of the masses, or the most painful and shocking perversions will occur. Of itself one of the purest and most exalted of emotions, it has earned itself as black a record as many of the vices, simply by having frequently been given unlimited sway over man's actions. The extremes of hatred, bigotry, and cruelty into which it has been led are, alas, household words, and in hatefulness, though not in frequency, equal, if not exceed those prompted by any of the "fleshy lusts." "Our army swore terribly in Flanders," but its profanity was not to be compared in either profuseness or malignity with the maledictions of an ordinary "sacrament" of excommunication.

The wrath of the "natural man" is fully appeased by killing his enemy, or at most scalping him afterwards, but that of the "holy father" or "shepherd of the flock" cannot rest at merely burning the heretic, but must damn his soul through all eternity as well.

The *superhuman* is sure to become the *inhuman* sooner or later. How much of the cruelty, intolerance, unscrupulousness, fatuous folly, which have too often marred the whole record of the Roman Catholic Church, have been due to her management solely by a body of professedly sexless clergy, who by their unnatural vow of celibacy are cut off from all the softening, humanising, ennobling, and refining influences of family life! What can they really know of the Great All Father, who are not and can never hope to be fathers themselves!

Morality is the flower born of all the struggling impulses of lowly but warm-hearted human nature, just as the violet is of the leaf-mold, the sunlight, and the dew. Any of the influences which had a *share* in its creation, *alone* would blight it, did not the others

come to its aid. Gentle as it is, it is irresistible and will flourish with equal placidity within our bosoms or among our ashes.

Beautiful, fragrant, and delicate though it be, it only asks the free air and sunlight of heaven, to defy alike the storm, the flood, and the tooth of time, and glorify the woodlands every spring until the sun grows cold.

WOODS HUTCHINSON.

UNIVERSITY OF BUFFALO.

PHILOSOPHICAL TERMINOLOGY AND ITS HISTORY.[1]

EXPOSITORY AND APPELLATORY.

I.

WHOEVER has at heart the interests of genuine monism, and would see the intellectual world united and a more intimate consolidation of human effort established, will joyfully welcome every attempt to close up the gaps in the realm of opinion and to facilitate mutual understanding. For this reason, if for no other, the peculiar language of philosophy is deserving of much greater consideration than usually falls to its share. From time immemorial the complaint has been made that philosophers frequently converse in different tongues and are incapable of understanding one another, that from this source no end of controversy has arisen and the advance of the work been materially impeded. And the further complaint has been made that the obscurity and ambiguity of its phraseology has utterly estranged philosophy from common life. There has been no dearth of projects for the removal of these undesirable conditions; but it is likely that more would have been accomplished had the language of philosophy itself been more closely scrutinised and studied. On the other hand, the field of terminology holds out unusual attractions to the scholar. A technical term, a mere word and sign, taken by itself, does indeed appear a matter of little moment, and, accordingly, it is very apt to be contemned. But if there is nothing insignificant generally for

[1] Translated from Professor Eucken's manuscript by Thomas J. McCormack.

science, the far-reaching connexions of the present subject with problems of broad interest and with the great intellectual movements of the present are so obtrusive that the fruitful issue of its pursuit cannot for a moment be doubted.

Technical terms take their rise in an intimate association, in a seemingly indissoluble union of concept and word. Things spoken and things thought, things of sense and things not of sense, are compacted by them into a unified product, and thus bear unmistakable testimony to the inward unity of the two worlds. A concept may carry on a species of existence without possessing a specific form of expression, but when such is the case it hovers like a spirit in the air and is apt to vanish again; at any rate its bodilessness prevents it from ever attaining a powerful stage of efficiency. On the other hand, a word may be current for a long time before it is taken up by science and converted into a vehicle for an idea. In such conditions there is wanting to it the significance that invests it with value for intellectual work. The union of body and mind, the intimate association of word and idea, alone creates the technical term. With the technical term a new being is born which has its own fortunes and its own history. The addition made to the subject by the word is by no means immaterial or subordinate, for a word is not empty and dead, but has a definite character, and awakens images and often emotions. There are words that affect us at once sympathetically, and others that as readily awaken in us antipathy, words that aid the idea or detract from it—felicitous and unfelicitous terms. One unfelicitous word of this class, for example, is the term *metaphysics*, the reason being that this word naturally awakens the impression that the philosophical study of first principles is concerned with something above and distinct from nature. Emotions are notably aroused by party names, because every one seeks to place his own cause in a favorable, and that of his opponents in an unfavorable light. Hobbes's remark on politics applies with equal force to philosophy (*De cive*, VII.); "solent homines per nomina non res tantum, sed et proprios affectus una significare." It is manifest, thus, that the history of terms is coincident neither with that of ideas nor with that of words.

The scientific terms which we employ to-day as self-evident in their meaning are the results of the intellectual labors of ages. We are the debtors in this regard of the Greeks and the Romans, of mediæval scholasticism and of all the leading nations of modern times. Every single technical term, viewed in this light, may be considered as possessing a distinct individuality and may be biographically treated; it has its birth and its death, it attains prominence and becomes obsolete, or, it issues victorious from the struggle for existence and becomes the permanent possession of science. To pursue the biography of words through their principal phases is often a fascinating but not less frequently a difficult task. The first question is when and where, in what environment and under what conditions, as well as from what motives a technical term has originated. Even the outward circumstances of fact are not always easily disclosed; for the new does not always turn out to be new;[1] in the majority of cases no satisfactory explanation can be had of its origin; and at times its novelty is intentionally concealed. Furthermore, words which are subsequently in every one's mouth often occur first in extremely out of the way places. For example, the word *optimist* was probably first used by Jesuit scholars to describe the system of Leibnitz (*Mémoires de Trevoux*, 1737, February); *theodicée* was first used by Leibnitz himself in 1697 in a letter to the Italian scholar Magliabecchi; *natura naturans*—a phrase which attained exceptional prominence in the hands of Giordano Bruno and Spinoza—is taken, as Erdmann and Siebeck have shown, from the Latin translation of Averroes.

Circumstances of chance may have a large share in the production of a new technical term; and consequently the facts of its origin do not always enable us to make positive deductions as to the character of the accompanying intellectual operations. But ordinarily it is increased interest in the idea itself and a powerful sense

[1] For example, Christian Wolff (*Phil. rationalis sive logica*, Cap. III., par. 85) says): "Datur alia adhuc philosophiæ naturalis pars, quæ fines rerum explicat, nomine adhuc destituta, etsi amplissima sit et utilissima. Dici posset teleologia." With regard to *sociology* Comte (*Cours de philosophie positive*, IV., 185) says: "Je crois devoir hasarder, dès à present, ce terme nouveau."

of its want that produces a term; a confession of faith, or even a thesis, may be wrapped up in a word. Thus there were weighty reasons why the word *deist*[1] appeared during the intellectual stirrings of the Reformation period, and why the word *rationalist*[2] arose during the English struggles for independence; why the word *pantheist* was coined in England in the beginning of the eighteenth century,[3] and why recent times also produced in England the word *agnostic*.[4] The desire to give to important ideas a convenient expression and wider circulation is the most powerful factor in the production of technical terms. Consequently, in the matter of form, considerations of beauty, and even of etymological correctness are of small importance. When Alexander Baumgarten, the pupil of Wolff, introduced the word *æsthetics* as describing the science of the beautiful, there was no lack of opposition from philological quarters, but opposition could not prevent the installation of the word. Comte's *sociology* is more barbarous still, but its practical and formal utility silenced all linguistic scruples.

It is one thing to coin a word, however, and another to get it generally adopted. To attain this last goal, a word has often a long and hard road to travel, although in other cases its adoption is exceedingly rapid, one might almost say explosive in its character. Frequently, a word which is afterwards to become the common possession of all educated men, is restricted for a long time to the narrow precincts of a school. A passage in Xenophon tells us, for example, that in his time *cosmos*, as an expression for the universe at large,

---

[1] In the *épître dédicatoire* of Viret's *Instruction Chrétienne*, which appeared in 1564, we read: "Il y en a plusieurs, qui confessent bien qu'ils croyent qu'il y a quelque Dieu et quelque Divinité, comme les Turcs et les Juifs. J'ai entendu qu'il y en a de cette bande, qui s'appellent Déistes, d'un mot tout nouveau, lequel il veulent opposer à Athéisme."

[2] Lechler, at page 61 of his *History of English Deism*, says: "In Clarendon's State-papers, Vol. II., p. xii of the introduction, an entry of the 14th of October, 1646, reads: "There is a new sect sprung up among them (Presbyterians and Independents) and these are the Rationalists; and what their reason dictates them in Church or State stands for good, until they be convinced with better."

[3] *Pantheist* was first used by Toland, 1705; *pantheism* by his opponent Fay, 1709.

[4] *Agnosticism* was coined by Huxley in 1859.

was still felt to be a strange term.[1] Lessing still treats *subjective* and *objective* as learned scholastic terms, whereas since Kant they have become securely established in common speech. The word *monism* coined by Christian Wolff only gained a limited circulation among the adherents of Hegel, and its present popularity is due to the modern theory of evolution.

As worthy of notice as its rise and adoption is the obsolescence and disappearance of a term. Conformably to the twofold motive underlying the creation of terms, the occasion of their production may reside either in the word or in the idea. The same idea can change its form of expression, or the term may grow obsolete because of the idea losing its ground. The change of the mere word is naturally less important, although in this case also there must exist good reasons why the change has occurred at a given time. Thus, there is a natural connexion between the sharp distinction drawn between mind and nature by Descartes and the reason why Robert Boyle introduced the term *materialist* to characterise thinkers who prior to that time had been called Epicureans or Democriteans.

But of greater importance, of course, is the fading away and disappearance of terms, for here we have palpable evidences of revolutions and transformations in the world of ideas. As the vocabulary of astronomy and alchemy vanished when they vanished, so the terms of philosophy lose their ground when the strata of thought disappear of which they are the expression. With scholasticism, scholastic terms also had to vanish. This last example, however, is an excellent instance also of the contrary proposition, that the fate of a term is not unconditionally bound up with that of the idea. A word which has fully established itself is a far too convenient implement, a far too powerful auxiliary to be given up lightly; and thus it comes to pass that men seek to save the word in the transformation of the idea and to adapt it to its new intellectual environment. This is what happened with the main terms of scholastic terminology broadly considered.

---

[1] Xenophon, Memor. I, 1, 11: *ὁ καλούμενος ὑπὸ τῶν σοφιστῶν κόσμος.*

After the Renaissance and the beginnings of modern philosophy had rejected this terminology wholesale, there was gradually brought about by a sort of inward transformation a renascence of scholastic terminology. How could we do to-day without words like *subjective* and *objective*, *formal* and *real*, *abstract* and *concrete*, *a priori* and *a posteriori*, *actual* and *virtual*, *individuality*, *ideal*, etc.? They are all children of scholasticism. If the meaning of terms changes thus while at the same time retaining some connexion with their earliest import, if amid all transformation such unmistakable continuity reigns, then certainly we have a right to speak of an inward history of terms,[1] and it is to be expected that this history will open a far deeper vista into the movement of thought than can their outward fortunes.

Before quitting this history, it is to be observed, that at times and in an analogous manner to the operations of organic nature, there are frequently left over, of whole groups and families of words, only a few species, which lead an isolated existence as survivals and are extremely difficult to understand. We speak nowadays of *moral certainty* (*certitudo moralis*); but we have no idea of what the expression *moral* signifies in this connexion until we resort to the terminology of scholasticism where moral is opposed to physical and has approximately the significance of "inward," so that, to cite an example, *causa moralis* was contrasted with *causa physica*.

The inward history of terms is extremely varied, and it can give distinct expression to mighty as well as to unobtrusive movements of thought with greater faithfulness and delicacy than any other method. We shall select only a few examples from the unlimited wealth of this field. Often we have brought to our notice the migration of a term from one province to another. Thomas Hyde, who in his book *Historia religionis veterum Persarum* (1700) was the first to use the expression *dualist*, denoted by the word a religious doctrine which simultaneously with the principle of the good posited a principle of evil of like eternality; and also Bayle used the word

[1] Lessing justly remarks, "the thing to which the usage of speech continues to give a definite name, certainly also continues to retain something in common with that thing for which this name was invented."

in this sense. But Christian Wolff applied the word to the relation of mind and body and so transplanted it into metaphysics. *A priori* and *a posteriori*, both late-mediæval terms, whose ultimate origin may be traced to Aristotle, first designated the opposition of deductive and of inductive procedure, but since the eighteenth century and particularly since Kant, have come to express the contrast between knowledge originating in pure thought and knowledge originating in experience. They have been transferred, accordingly, from methodology to epistemology. *Egoism* in the first half of the eighteenth century was the name of a theoretical doctrine which recognised the individual ego of the thinking person as the only real existent; in the second half of that century, the transition to its present meaning was effected.

In such transitions may often be found incorporated the broadest tendencies of contemporary thought. Towards the close of antiquity we see philosophical terms undergo a transformation from the theoretical into the practical and ethical. On the other hand, in the last few centuries the movement of thought has been from the objective to the subjective, from metaphysics to epistemology and psychology. Throughout the whole history of this period, terms for outward things (for example, *culture*, *organic*, *mechanical*) have been converted into terms for internal things. But this movement has an extremely variable tempo and exhibits the most diversified phases.

Furthermore, terms may exhibit extremely varied transformations of inward composition. By *monism*, Christian Wolff sought to describe that view of the world which regarded either the physical principle or the mental principle as the sole and ultimate substratum of reality. A word so artificial in its character as this, which embraced in the same class the extremest differences, could not of course establish itself. But the word existed and merely awaited employment in some other sense. This it found at the hands of the school of Hegel who were the first to employ it spiritualistically to designate a view of the world which conquered all self-contradictions and antitheses. The meaning which the word predominantly has at present in Germany most likely came from Haeckel and

Schleicher of Jena. However, while Haeckel identifies monism with mechanicalism and materialism, the editor of the present journal, which bears the name of *The Monist*, again broadens the meaning of the term, defining monism as a unitary world-conception, its method being consistency of thought and its ideal a harmonious and systematic presentation of the various aspects of truth.

Such transformative processes may extend over thousands of years and reflect in miniature all the main phases of evolution. For example, this is the case with the word *idea*. Not only in this word are such enormous differences clearly distinguished from one another as occur in the ontological and æsthetical thought of Plato, the religious speculations of Philo and Plotinus, the psychological of Descartes and Locke, and the transcendental of Kant, but almost every independent thinker has found expression of his individuality in delicate shades of usage of this word.

In such transformations terms may depart very widely from their original significations, nay, form a direct antithesis thereto; and they may in their career follow diametrically opposite paths. *Form* signified in scholastic usage the essence which shaped things from within; subsequently, outward appearance. *Evolution* in the eighteenth century was the name of Leibnitz's theory of development, which conceived all growth of organic nature as the mere swelling or enlargement of diminutive preformations—the so-called encasement theory, against which C. F. Wolff directed his famous *Theoria generationis*. But now this designation is borne by the *modern* theory of development, which inclines to the view of Wolff and is diametrically opposed to that of Leibnitz. Also the complete inversion of meaning is known which the expressions *subjective* and *objective* have suffered, as compared with their scholastic usage. Until the end of the seventeenth century the word *subjective*, being the adjective derived from and referring to *subject* or *subjectum*, had the precise significance that the word *objective* now has, and *vice versa*. The revolution in the meaning of this word started in Germany, and for a long time it was felt by other nations as a strange innovation. The transformation would hardly have been possible

had not the terms been transplanted into a different language and into a different intellectual environment.

So far we have regarded terms entirely as individual elements, but our subject acquires a far higher interest when we take up the study of the mutual relations of the individual elements and seek out the meaning of their union in larger organic groups. Here are to be met the most varied complications and interactions, now mutual reinforcement, now pronounced hostility, here quiet persistence, there rapid change—the whole a kaleidoscopic and frequently fascinating spectacle. Running throughout the whole there is a common effort traceable, a common seeking after the appropriate and adequate designation of the ideas controlling our thought; everywhere we find acting, so to speak, a teleological principle, a principle of selection of the fittest. But this effort and aspiration does not come from without as the result of reflective thought; it acts through and by way of the individual elements, and is their own intimate outcome. The elements must needs develop and do battle with one another, so as to show their potency. Looking at these individual events solely, we observe a predominantly molecular and mechanical action; pure and actual matters of fact are displayed; principles like heredity, struggle for existence, and adaptation to the environment play in this process at least a prominent part, if not exactly that which is observable in nature. The real motive factors cannot be clearly established until all is considered as a whole, despite the fact that we have their activity brought distinctly to our notice in the individual terms themselves.

Manifestly the existence of terms is subject to the conflicting influences of a tendency to persist and of a tendency to change, where *existence* means actual living employment in science as distinguished from mere historical occurrence. A term once in existence, now, is easily kept in existence by being handed down from generation to generation, or by simple heredity. A term offers to thought a convenient tool, an unfailing lever, and opens up extremely easy paths. It is given to us without labor on our part by the hand of tradition, and is communicated to us as a matter of course. Is there any wonder that we accept it calmly and continue

to employ it as it was given into our possession? A term has here all the impregnable authority of an ultimate fact. It is forgotten that often it contains more than a mere designation, and may be the embodiment of an extremely problematic opinion. We find thus displayed here a faculty of permanence, a genuine "natural inertia." We never recognise its potency more distinctly than in the stupendous power of resistance which established distinctions possess; it would seem as if they could never be made to loose their hold on the mind. The four temperaments with their characteristic phraseology have been preserved to the present day through all the mutations of physiological and psychological theories; the old form was so puissant that the new ideas had to make use of them in order to gain acceptance themselves. The power of actuality augments by simple persistence; the term becomes more and more firmly established and more and more firmly interwoven with the rest of tradition. If this tendency to persist encounters no opposition, the terms will also gradually come to form among themselves an aggregate of increasing solidity and finally become consolidated into a system; but then, despite all the resultant advantages of formal elaboration, there is a constant danger of inward torpor and a cessation of intellectual progress, whereof we have an example in the later phases of scholasticism.

Where the intellectual life is vigorous and buoyant, there is no want of counteraction by transformative forces. Where terms are part of a living tongue, the incessant though scarcely perceptible changes in the meanings of words ensure them from becoming absolutely rigid. In an unusual degree are the conditions of existence surrounding terms altered by the transference of intellectual achievements to a new language. But the stability of terms is most powerfully and frequently shaken by stupendous catastrophes and revolutions in the realm of thought, or by the shifting of the main bent of philosophy. In all such movements frequently several candidates lay claim to the same place or standing. If no intellectual compromise can be effected by a division of the domain, one must give way before the other in the fierce struggle for existence that necessarily ensues. In this way in periods of fruitful

creative activity the single systems come into hostile conflict. None can control the empire of thought unless it is successful in enforcing general acceptance for its terminology. But by the very act of achieving this victory, that is, by the very act of their passing into common speech, they lose a certain amount of their peculiar characteristics, although the loss is not total. Thus, much of the spirit of systems still abides in the terms imposed by them on the world, and their influence, although unobtrusive and recondite, is still generally noticeable and enables us to form a judgment of the measure of their success. Terms that are not accepted may persist within the school itself, but their life is severed from the general movement of thought, and their cultivation is entirely artificial.

A different kind of contest arises when the traditional phraseology of a language comes into conflict with the traditional phraseology of a foreign tongue. In a limited degree this conflict is enacted wherever one civilised nation is in contact with another. It comes to pass on a far grander scale where a large mass of intellectual achievement is transplanted totally to the soil of a new language. In such a conjuncture the continuity of tradition is broken. A sifting and winnowing of the material is imperative. Even the terms that are preserved must establish their right anew, and frequently undergo adaptive modification in respect of form. On the other hand, even after a term has asserted its initial fitness, still its position is not definitively assured; for the deeper the intellectual movement strikes root in the new soil, the more imperative is its demand for forms adapted to this new soil; new expressions are coined and act with all the fresh and vigorous potency of natural and original elements, whilst the old has all the advantages of assured position. Even when the new terms are actually advancing and on the general road to acceptance, still victory is not assured in all cases. A contest of the kind referred to was conducted by the Romans against the Greek terminology, and by the Germans against the Latin terminology of the schoolmen. The Germans had the advantage of a more opulent and flexible tongue, but the Romans presented a solider front, and better understood the method of consolidating the achievements of individuals into an organic

whole. Where two terms laid claim to the same place, not infrequently both were preserved side by side, whereupon afterwards a differentiation of ideas ensued. Originally mere outward inducements to fix the meanings of different words as regards one another have in the end frequently led to an inward and profound subtilisation of thought. As often happens in the world, an advance was here also made from without to within, and accidental circumstances aided the advancement of reason.

The inward displacement of the intellectual situation by new systems of thought must be great according as the rupture of the new with the old is abrupt and its way of stamping itself on the thought of the times is vigorous. Particularly severe will the collision be at the points where the centre of the new system is situated; for here least of all can the thinker accommodate his mind to the strange forms. At this point, consequently, either a new formation must result or the old must become adapted by inward transformation to the new conditions of life. But though every system imparts from its centre a new undulation into the sea of terminology, yet the behavior of thinkers varies greatly in this regard. One class treat the form as something unessential, in fact have a positive dread of giving a determinate form to their systems, going so far as to regard such procedure as a restriction. Such was the manner of Fichte. Others, on the other hand, cannot rest until their ideas have found full and permanent incarnation. On this question men like Plato and Leibnitz have held liberal views; Aristotle and Kant have observed a more rigorous standard. For terminology the latter are the leading spirits.

All these processes vary in intensity and pursue different courses, according as they deal with technical terms proper—terms which describe a definite subject or a definite activity, that is, define some actual matter of fact—or as they deal with terms that involve a characterisation or judgment, as, for example all party names do. Since the latter appeal in a high degree to the emotions, they are consequently subject to far more vacillation. Powerful impulses from without are not needed for shifting the situation in the case of such terms; in fact, their own development trans-

forms it of itself. These terms go through some such course of development as fashions; they annihilate themselves by a species of immanent dialectic. For a thing that springs up originally as having a special significance and as designed to mark off a definite movement from others, is, when its aim has been accomplished, appropriated by others. But the more the number of its claimants increases, the more the word comes into general circulation, the more it loses its discriminative efficacy, the more it is exhausted and worn out. Its bearers must look about them for some new expression whereby to distinguish themselves sharply and unmistakably from others. Thus its outward diffusion results in inward annihilation, and the repeated exhaustion and constant change of party names is rendered intelligible.

In glancing over the changes which the total body of terms undergoes in all these movements, a contrary direction of development is unmistakably obvious. On the one hand, there prevails a tendency for increasing minuteness of ramification and sharper differentiations, and on the other hand a desire for simplicity and for reducing systems to clear and stable fundamental lines. Where the foundations of a work persist unchanged and the construction of the edifice is quietly continued, we have always to expect increasing carefulness of elaboration and increasing exactness in the specification of the ideas of the system and consequently of its terminology. This process is displayed with special distinctness in later scholasticism. But it involves the danger, which runs hand in hand with increasing subtilisation, of losing touch with direct and living experience, and of degenerating into artificial routine. If the foundations are then attacked, there is eminent peril of the whole structure collapsing. Subsequently, and as the result thereof, the tendency arises to repudiate entirely all subtle definitions and to fix the meaning of only the most simple, the most incontestable and the most immediate notions.

This is what was done by the great thinkers of the seventeenth century, and by none more than by Spinoza. In all the crucial points of his system we find him constantly bent on exhibiting the identity of ideas which formerly were discriminated with great zeal

and assiduity; again and again we meet in the works of this great monist the characteristic phrase, *unum et idem sunt*. On the new soil, of course, the need of discrimination subsequently again arises, and consequently the same danger may set in that it was first sought to escape. History thus offers the spectacle of successive simplification and differentiation: like Penelope it always seems to be unravelling what it has woven.

In reality, however, this stupendous movement is not without its results. At one time there remains a choice total of permanent gain; at another there is the hope that, just as cognition is directed to true problems by the experiences gained in strife and controversy, so also in terms there is constantly brought to expression more matter of fact. Since thought is always advancing into infinite stretches ahead of it, and the means of expression also must constantly change, consequently also terminology can arrive at no final goal but must continue in constant development. We must rest satisfied that this movement is not entirely without its fruits.

II.

The foregoing considerations concerning philosophical terminology might still be developed in many different directions and in far greater detail. Furthermore, they might be brought into relationship with the general problems of language and of the latter's relation to thought. This task, however, would carry us too far, and the little that has been said is perhaps sufficient to establish the significance and fruitfulness of this province of inquiry. A wide domain of research is thrown open here which affords abundant material for study and discovery, and in addition is eminently apt to give assistance in the solution of other scientific problems. The manner in which individual thinkers, nations, and epochs give expression to their thoughts, furnishes an important contribution to the portrayal and appreciation of their character. But, most strikingly of all, the individual is more precisely appreciated, more accurately interpreted, and more distinctly comprehended in his individuality when the peculiar traits of his language are fully grasped.

We come to know in our study of terms individuals, epochs, and nations, as well in their isolated states as in their relations to one another. We recognise the influence which the work of the individual has exercised upon the collective social body. Relations which otherwise would have remained obscure rapidly lend themselves to comprehension from this point of view. Nay, even the collective spectacle of history receives by this procedure a peculiar form—in that it is made to appear less as a continuously flowing current than as a luxuriant mass of branches and foliage or as a complex and intricately woven texture. The individuality and distinctness of the results and creations are brought more visibly to the fore. By having our attention diverted from the results and fastened more particularly upon the means and conditions of the work, the elementary and individual forces involved are more apt to obtain recognition, with the result that the importance of an exact inquiry into the historical facts as distinguished from the speculative treatment of the same, is strongly emphasised, although without rendering the speculative treatment superfluous, nor in any manner dispensing with it.

But this increased importance of individuals and of individual achievements is far from resulting in segregation and waste. On the contrary, here more than elsewhere all things are mutually determined and mutually associated. Not only is the upshot of the individual's achievements parcel of the collective social body, but he himself is indissolubly linked with that body in the conditions and suppositions of his performances. In words and terms the labors of centuries flow in upon the individual; an intellectual environment receives him here with silent but powerful influences. The movement of terms exhibits history far more continuously and uninterruptedly than could possibly be observed from the struggle of ideas. Even opponents meet on this common ground and can profit by contact. Thus is demonstrated and strengthened here that treatment and view of history and sociology which forms a marked characteristic of our nineteenth century. At the same time the limitations of this view and of the influence of the collective social body are just at this point rendered manifest. Tradition is useful only

when it does not suppress the native activity of the individual. Traditional terminology aids scientific work only when it is grasped by independent thought, carefully tested, and revivified. If some such opposing influence is wanting and individual power is not exerted on this subject, the heirloom of ages may be converted into a fateful burden, intellectual labor perforce will stagnate, grow formal and even erroneous. Thus history and society do not hold sway over the individual as an unavoidable destiny, but the interaction, or, as we might say, the struggle of individuals with the collective body, of the present with the past, is the fountain-head of all true life.

But inquiry into terminology is not only the condition of intimate and fruitful contact with history, it can also directly promote the work of philosophy itself. Concerning the dangers of obscure language, concerning the disadvantages of changing and ambiguous expressions, there can be no doubt. But it is far easier to complain of such conditions than to devise means for removing them. Yet unquestionably such a means, such a solid *point d'appui*, is offered by the illumination which historical research sheds on the character of terms. The constraint here exercised induces us to deal more seriously with terms and to insist upon precise significations. The historical pursuit of a term from the time of its origin to the present cannot help making it more transparent; things that lie hidden and often fused in our present stock of variant meanings, things therein that are merely the echoes of former phases of existence, are all detached and set off in single definiteness by this genetic mode of consideration. The conditions and suppositions of the present become clearer to us. By the injection of new life into the term the idea receives greater precision. Lastly, we also gain in our own work on understanding how the created has sprung from the creating.

The opinion is not infrequently advanced that all controversy in philosophy is simply a result of misunderstandings and that agreement in the matter of words would also bring about agreement in the matter of things. So thought most of the thinkers of the seventeenth century, including Descartes and Spinoza. But Kant

repudiated the view with much vehemence. To him the work of philosophy appeared to involve too many antinomies of fact to warrant any hope of composing them by a mere clarification of language. Unquestionably, Kant is right on this point; but if this method is not able to establish complete peace in philosophy, it is certainly a powerful enemy of all unnecessary controversy. Inasmuch as a clarification of verbal expression lessens the number of purely verbal disputes, all the more time and strength can be expended upon real problems and genuine inconsistencies; and that is certainly much. It was a pretty *mot* of Kuno Fischer that true problems are true thoughts. When its energies are applied to true problems, philosophy will bear richer fruits, and we may cherish the hope of its promoting the advancement of the whole even by the very struggles and conflicts which it involves.

III.

A province of scientific inquiry which offers such a plenitude of material and bears on such important questions, and whose bent and character harmonises with such powerful intellectual movements of our time, should arouse much interest and also much activity. The more so as ever since the beginning of modern philosophy the import of scientific terms has been incessantly forced into notice, and principally by English inquirers, from Bacon and Locke down to Whewell and Mill. If the tendency to treat history exactly is added, we have all the conditions of a progressive development. In fact, much interest is taken and much labor is being expended in this direction, and the attention of thinkers has been sharpened for the questions involved, both in the portraiture of great inquirers and in the editing of their works. More notice is being paid to the subject of terminology, while there is a distinct increase in the number of monographs on important single terms. But with all its individual achievements the state of the province as a whole is far from satisfactory. There is a lack of concentration, of organisation, embracing and holding together the scattered results and guarding the laborers against a useless waste of effort; and the

reason of this lack is solely that questions are treated incidentally and supplementarily, which can be brought into inward and outward connexion only by being independently elaborated and by being made an end in themselves.

It has been the fundamental idea of our inquiry that the term as a union of idea and word possesses a peculiar character and has shared peculiar fortunes. If this view be correct, then terminology must take a place apart and become an independent discipline within the domain of philosophy, and the branches of research bearing upon it must converge and be formed into an intimately connected whole. But this can never be accomplished from detached and isolated points of attack, but demands the protective oversight of some common organising head, such as can only be found in some learned body, academy, or university. Such a body should undertake the compilation of a large thesaurus of terms, on which, in view of the prodigious mass of materials and their vast ramifications, innumerable scholars should be set to work. An archive for terminology would have to prepare the way for and support this undertaking. Having thus obtained a secure foundation, not only would all individual labor be rendered easier and more productive, but an abridged philosophical dictionary could be compiled for the needs of educated people generally. Many are forced to dispense with such a work at great intellectual cost and sorrow, and besides such a dictionary would augment not a little the influence of philosophy on common life. A vast and difficult task, but one which bids fair to yield much fruit.

The organisation absolutely necessary to this end, I have for many years repeatedly recommended in Germany, and have also sought to create an interest for the project by special treatises.[1] Of assenting voices among individual colleagues there has been no lack,—latterly Dr. Schmidkunz of Munich has taken up the cause,—but nowhere has the organisation been set on foot, and so far as I

[1] *Geschichte der philosophischen Terminologie im Umriss*, 1879; *Parteien una Parteinamen in der Philosophie* (in *Beiträge zur Geschichte der neuern Philosophie*, 1886.)

know there is nowhere hope of it. Here, therefore, is a chance and a task awaiting America, where there is no lack of scholarship, talent for organisation, nor of readiness to make sacrifices. American scientists have proved themselves by their work in other fields to be the peers of the scholars of the Old World; why, therefore, should they not undertake the leadership in this new branch which treats of the history and development of the language of philosophy?

RUDOLF EUCKEN.

JENA.

ON THE ORIGIN AND IMPORT OF THE IDEA OF CAUSALITY.[1]

MORE than a hundred and fifty years have elapsed since David Hume, in his critical inquiries concerning the human understanding, subjected to exhaustive scrutiny the idea of causality. The impoverishment of this idea, the restriction of its meaning which Hume's analysis proclaimed, reposed on a peculiar view of the genesis of this notion. This latter study had since Locke been regarded as the safest method of establishing the epistemological value of ideas. The epistemological value of an idea is determined by the amount of reality entering the idea. Reality is synonymous with that which may be made the subject of direct experience, with that which is perceived, and not with that which is represented or thought,—in fine, with what Hume called *impression* as distinguished from *idea*. And every critical examination of ideas necessarily goes back in the end to the question: What definite experiences, what impressions lie at the bottom of them? Hume, as we know, subjected to the test of this logical reagent a large number of ideas, and with regard to all of them came to the same sceptical conclusion,—that in the popular as well as in the scientific usage these ideas had far more intellectual contents than could be warranted by their actual cognitive or experiential elements, and consequently that this surplus was more a product of imagination than of reason, more fancy than knowledge.

Of all the ideas which Hume investigated, that of causality is unquestionably the most important. It is the cardinal notion in

[1] Translated from Professor Jodl's manuscript by Thomas J. McCormack.

the comprehension and arrangement of all the changes which we experience—a leading concept both in the physical and in the mental sciences. Our whole scientific world-view is determined by the meaning we give to it. Precisely at this point, moreover, has the influence of Hume's criticism been particularly lasting. Both science and philosophy have bowed to his arguments, and, so, have lapsed into a species of habitual scepticism for which in the nature of the case there was no real foundation. The irrefutability of Hume has grown into a virtual dogma, and it will doubtless repay the trouble, as it generally does in such cases, to submit this dogma to searching and exact analysis.

According to the notion of causality, as it was commonly accepted in the popular and scientific thought of Hume's time, a change occurring in nature was interpreted as having its origin in an antecedent change or motion connected therewith in time, as being effected by its antecedent, or as being *necessarily* conjoined with it. On the basis of his analysis now, Hume excludes from the contents of this idea all connexion among the things themselves, all objective connexion, as also the necessity of such connexion; he leaves nothing standing but a connexion of ideas and the *feeling* of a certain necessity in this connexion, that is, a subjective connexion. Causality, says Hume, implies no connexion of things, for this would require that some special perception should be given us of the bond which links two phenomena together. But nothing of this sort has ever been observed. The impressions on the basis of which we causally connect two phenomena never present anything more than regular succession. Nor does causality involve connexion by virtue of the contents of the conjoined ideas, somewhat as we are able to develop a system of geometrical properties from the ideas of the circle, radius, and tangent. There is no logical connexion involved. For no one can infer from the idea of a thing what its effects must be, or what it has been the effect of. Our causal judgments are dependent entirely on experience. But this furnishes us with nothing but regular succession, and this alone gives rise to the so-called necessity of causal connexion, which is merely a habit or propensity of our imagination to associate regularly succeeding ideas, to pass

from the one to the other, to expect or to foretell from the one the other.

So much for the sceptical arguments of Hume. Of their extraordinary influence I have already spoken. The entire Kantian philosophy, wherever its influence reaches, is almost completely dominated by them. Neither Kant nor his followers ever ventured to assert in contravention of Hume that causality could imply a necessary connexion in the objective world. Their sole makeshift was the ennobling, I might say, of what was substituted for this objective connexion. They made out of a habit of the imagination, out of a law of association, a primitive and original function of the understanding—a category. But it is clear that this statement of the problem of knowledge is in no essential point an advance on Hume. For the word *knowledge* bears its right meaning only when what is so called produces in us a consciousness of objective relations. But universal subjectivity is not the same as objectivity. An order of things proceeding *solely* from innate functions of the mind would be a conceptual architectonic figment, possibly of great rigidity and regularity,—a system of necessary illusions of the race, but not knowledge. It is a matter of course that all knowledge is partly mediated by consciousness, is a joint action of the ego and the non-ego. Absolute knowledge—that is, such as would be at the same time the thing itself—does not exist. All knowledge is a blending, a unification of the ideal and the real.

But not only Kant and Kantians of all shades down to Fr. A. Lange and Fr. Zöllner have surrendered unconditionally to Hume. H. Lotze also advances substantially the same ideas and teaches the doctrine of the unessential character of all causal relations for thought and the impossibility of discovering a bond between cause and effect. And when he attempts to overcome this isolation of the single elements of the world by assuming that they are all members of a single being and unitary substance, surely this is equivalent to seeking in remote metaphysical cloudlands truths which lie unnoticed at our feet. For inasmuch as all things in the world are far from being causally connected with all other things but in all cases definite effects only are dependent on definite

causes, therefore the substantial unity of the world cannot enlighten us regarding the validity of our causal judgments and their epistemological value—but in reality the connexion sought is to be found in more proximate regions, namely, in the order and happenings of the actual world.

For certainly—to set the matter at once aright—the truth does not lie in the direction indicated by Kant, nor by Kantianism and the idealistic metaphysics. This line of thought, far from leading away from scepticism, actually plunges thinkers deeper and deeper into it, finally landing them by a perfectly intelligible reversion in mysticism. The truth does reside in empiricism, but it requires for its discovery a more searching examination of experience. The empiricism of Hume is not too much empirical but too little empirical. His description of the facts of experience is not exact enough. He jumps too frequently to constructions. I shall now set about demonstrating my assertions in detail.

Hume had asked in what fact of immediate experience, in what impression is the connexion between two phenomena given which we have in mind when we say that they are causally united. He had answered, there is no such impression. The phenomena, or the ideas representing them, are absolutely distinct; there is no bridge leading from the one to the other, except that of custom. The causal law is nothing but the law of our psychological mechanism.

Is this a perfectly exact and apposite description of the facts? Whoever replies in the affirmative is irrevocably a captive of Hume's reasoning and can escape his conclusions in appearance only, or by extremely artificial devices. It is my belief, however, that this question must be answered in the negative. Misled by certain prejudices of the philosophy of his time, Hume did not rightly envisage the facts which led to his theory. What were those prejudices? Locke in his examination of the human understanding proceeded from an assumption which also thoroughly dominates Hume's inquiry: that the original, *actual* path of development of consciousness was the same as that of psychological analysis, only contrary in direction. Psychological analysis dissects the contents

of consciousness, separates the individual phenomena from one another, and endeavors to apprehend their simplest and most primitive forms of appearance. No one will deny the value of such inquiries, nor of the profound vistas which they afford into the hidden mechanism of consciousness. But psychological and epistemological methods are not identical, no more than are anatomical and embryological.

The blending of these two problems is characteristic of the entire period of criticism to which Hume belongs. It was thought that the epistemological problem could be solved by undertaking a synthetic construction of the contents of consciousness from the elementary facts which psychological analysis had revealed. It was supposed that what was simple and ultimate in a psychological regard was also adequate to explain our perceptual and intellectual complexes. This is tantamount to asserting that a knowledge of the chemical constitution of a body is able to furnish us with a direct sensuous picture of that body. It would be the same as if an anatomist after singly studying and depicting the myriad parts of an organism should form a new synthesis of them and imagine he had apprehended in so doing the secret of life. Consciousness is an organism like the living body; not a mosaic that can be taken apart and then rebuilt from its elements on the same plan. In fact, we must go a step further and say, the simple, the elementary is never a datum, but is an abstraction—not a thing experienced but a thing thought. In actual experience, apart from all psychological reflexion, the elementary, or what Locke calls "simple ideas," never occurs. In point of fact, we have experience only of complexes, complexes of sensations of varying qualities and modalities, combinations of motions with sensations, combinations of sensation and motion with feelings and volitions—complexes in which some of the individual constituents suffer change and modification whilst others remain unmodified. These complexes are the original data of consciousness. We renounce all possibility of insight into the real foundations and epistemological value of our ideas if we regard these complexes or syntheses as the subsequent products of conscious activity whose origin from isolated elements is in need of

some additional explanatory principle. This is a complete inversion of the situation and involves us in struggles with difficulties of which we ourselves are the creators.

That unification, that complexus which makes of a group of sensations a "thing"; that complexus which presents a causal relation—that is the simple original element for the non-reflecting consciousness. The separation of its constituent parts, the analysis of the complex into its elements is a work of thought, of abstraction. There is never in consciousness absolutely unformed matter, a raw material of sensation on which the mind imposes form from its own exclusive stores—for the simple reason that in the world which our sensations reflect no such thing exists. The ideas of matter and form are here as everywhere altogether relative. Thus also pure formal thought cannot be in consciousness entirely before experience, making possible experience itself; but consciousness by the exercise of reflective thought picks out from the unanalysed contents of experience what the early critical philosophy called ideas of form or *Stammbegriffe*. If these were not immediately contained in original data of experience, we could never arrive at knowledge by means of them, but at best could perform constructions. Hence the question regarding the bond which knits together our perceptual complexes, or regarding the source from which the form of our sensations springs, can only be understood from the point of view of a matured reflexion to which for some reason or other the immediate data of experience have been made the subject of doubt. The simple man, the man of early stages of civilisation, the adolescent man, would not grasp the question at all—it is extremely difficult even to make him understand what it means. For the perceptions by which formal conceptions, say the idea of cause and effect, are awakened in him are not distinct, detached, and isolated perceptions, but a complex of perceptions of which one always stands to the others in a relation of contiguity, of which one passes into the other or is transformed into it, and which for him, therefore, are not separated but belong together and form a whole.

The contents of the notion of causality in the natural conscious-

ness, therefore, is something more than and different from what it is in Hume's explanation. Even the non-scientific consciousness discriminates quite readily between the inward compulsion of an association and the outward necessity of a relation of causality. Not everything that constitutes by reason of regular succession an association, a propensity to pass from one thing to another, is conceived as causally connected—a distinct proof that in Hume's explanation all the contents of the idea have not attained their full expression.

This explanation exhibits a surprising similarity to the exposition which a movement in modern psychology, resting on allied fundamental views and which is often also termed empiricism, has given of the origin of the perception of space. This psychological empiricism has attempted the feat of showing how spatial character can be imparted by sensations of movement to contents of sensation to which originally the spatial quality was wanting. But the muscular sensations of the moving eyeball could never engender the optical intuition of space unless the sight-sensations had from the beginning been definitely arranged and fixed in visual space—they can only give greater distinctness to this originally incomplete arrangement.

No more can habitual connexions of two objects or ideas through a relation of sequence produce the true notion of causality, as the general consciousness of mankind employs it, although as we shall see, in this notion regularity of temporal succession also forms a factor and that no inconsiderable one.

But the deepest root of the notion of causality has not yet been disclosed in the preceding considerations. So far, we have only marked out in the path trodden by Hume the place where this acute thinker strayed from the right trail. The natural complexus of sensations which we were constrained to substitute for simple ideas as the real epistemological element, is not of itself sufficient for our purposes. Natural complexes of perception also lie at the foundation of the notion of thing, of the notion of substance, of the notion of space and time, of the notion of the ego and the non-ego. The question is what additional elements must be contained in such

a complex in order to engender the notion of causality, or, what is the same thing, to make the members conjoined in such a complex appear as cause and effect.

Our purpose may be made plainer if we reflect that man is not only a representing but also a willing being; not only passive but also active; that not only do the images of the world pass before his mental vision, but that he has also the consciousness of action, of interference, of independent creation, and of being a cause himself. In the notion of causality, as was said above, every one has in mind the notion of a change which has been effected or occasioned by an antecedent. Can it be, that the type of this idea is really so inapprehensible? Are we to think that all the changes in the objective world which emanate from the ego, as when we change the position of a thing, take something into our hand or throw it away, when we put food into our mouths, make something, or divide something, or put something together, when we make something sound or vibrate—that all these processes or changes in the objective world are not to be conceived as having been produced by the ego? Volition, motion, the feeling of force, change in the world of objects—which for the very reason that we are successively aware of them as conforming to the manner and direction of our motion and with the measure of our power, appear as an equivalent or as a transformation of our motion—here we have a complexus of perceptions, no member of which is isolated and distinct from the rest, but which are involved in continuous and constant transitions, exhibit partly spatial, partly temporal contiguity, which form an indiscerptible totality, and from which the individual factors can be disengaged only by extremely mature reflexion. But reflexion of this kind is foreign to the ingenuous man. Since not a shade of doubt prevails in his mind concerning the connexion of his movements with his power and will, and again concerning the connexion of a movement willed by him with the results accomplished before his eyes: consequently this event becomes for him in its entirety the type and exemplar of causality.

Effect, "effected," is that which one endowed with power makes, creates, or shapes by means of this his power. This is the real

root of the notion of causality as man fashioned it previously to all science and theory of knowledge, through intimate contact with his needs and his abilities, and consequently with his instinct of self-preservation. Let us picture to ourselves but for a moment the importance for man of the changes produced in the outward world through his initiative power,—the slaying of enemies, of beasts of prey, the felling of trees, the manufacture of weapons, tools, utensils, the production of fire, etc.,—and we shall no longer be tempted to doubt that the strong impression which this relation must have made on consciousness was the first and most original source whence the notion of producing effects, of causal connexion sprang.

It has been held that we must dig deeper in order to lay bare the true root of the notion of causality, and that for this purpose reference must be had to certain phenomena of inward experience—the following of a conclusion from its premises, the desiring of means for the sake of the end that can be reached by the means. Here and only here, is necessary connexion, inward conjunction, effectedness, absolutely evident. We are concerned here, according to the unequivocal declarations of inward experience, not with habitual succession, but with genuine causation. Now unquestionably it must be granted that the connexion of these psychical processes answers perfectly to the notion of causality as that takes shape after a rigorous epistemological and critical elaboration. They are perfect types of psychical causation. But whatever services they may render in a logical or epistemological examination of the idea of causality, they are totally unqualified to supply the genetic foundations of this idea.

All development of consciousness proceeds from without to within. Man, in his earlier stages totally naïve and absolutely abandoned to the contemplation of objective things, learns only very gradually the art of scrutinising inward processes. Things interest him, not the consciousness of things; the way things hang together, and not the way consciousness acts. The discovery of mind in his inner life must be relegated without exception to a subsequent stage. It is putting the cart before the horse to make the connexion of purely psychical phenomena the prototype of causal-

ity, the key to the changes of the outer world and the key to the understanding of what is effected by our will, by our power. Man is wont to take little notice of the formal character of these psychical processes, for the reason that he is concerned only with the result and its practical utility. The thought which flows from given assumptions, the willing of the means for the sake of the end, exist, by the sheer power of the psychical mechanism, merely and always when the appropriate conditions are given; but the mediating process itself is never made the object of search. Remotest of all, however, from the unspeculative mind is the idea of comparing these psychical mediations with the momentous changes which we produce in the outer world. So remote, in fact, that not even Hume, although he regarded many causal relations between psychical processes as something self-evident, e. g., the influence on ideas of the corresponding impressions, the production of belief and of passions by prospective events,—that even he never hit upon the possibility that the typical form for the connexion of events in outward reality inhered in the above adduced connexions between psychical processes, although he unquestionably recognised these as real.

Thus, the behavior of one of the acutest of analytical thinkers, Hume, proves how artificial and far-fetched is the attempt made by some modern psychologists to derive the notion of causality from purely psychical processes. Conversely, the history of the development of human thought proves, that the genesis here given of the notion is not a mere logical creation. Mythological thought—the first form in which man sought to rationalise the surrounding world of phenomena—shows that the experience of personal creation, personal activity, is the prototype of causality; that those transformations in the world which man himself does not produce, are first rendered intelligible upon his assuming the presence of acting Beings within them. The circumstance is also to be marked that these beings—the gods and demigods of all ranks and degrees—have never been perceived; and that consequently the human imagination had to execute here a difficult construction, had to perform a genuine act of creation in order to arrive at these mental fictions with which the intellectual history of all peoples, the crud-

est as well as the most gifted, teems. This circumstance itself proves that the root of the notion of causality cannot reside in the alleged psychical connexions. For, if the natural model of the notion of causality were really contained in these experiences of inward perception,—can it be imagined that human reason, whilst possessing such an implement for constructing and interpreting the connexions of natural changes, could have lighted at all on the expedient of personification? Obviously, there is but one reason why the mythological habit of thought arose and established itself, and that is because no other connexion between results effected and the agent effecting them is primitively intelligible, except that where the effecting agent appears as the will and power of a person. Is the idea of God aught else in the minds of most people than the largest and hugest product of this naïve instinct of causality, which never rests satisfied until it is thrown back upon personal action and creation?

And as a further proof that we are on the right track here, attention may be drawn to the fact that even where the idea of personal action has receded into the background, there is still a fair portion preserved of this ancient, I might almost say paleontological, notion of causality,—a portion the mere announcement of whose name is sufficient to bring home to every one its tremendous significance for human thought and its connexion with the idea of personal activity. I refer to the notion of force. No one will deny that we have derived this notion from self-perception,—whether from the force which we ourselves as willing persons exert, in order to do or accomplish something, or to produce certain changes; or from the impressions which we receive when outside things act on us. Whether active or passive, we are conscious of forces—now of our own force, now of outside force. And on the basis of this immediate experience we interpret as activity and passivity all those processes in the surrounding world in which we personally are not concerned in either of these forms. It is plain that force, too, is nothing but a weakened mythological personification. It is plain that a phenomenon is no more explained on tracing it back to a force than if we had traced it back to a deity. The ideas

which accompany the thinking of the notion force are at best but an abridged expression of the facts themselves, of definite quantities of motion at definite points of the physical world. But the enormous diffusion and use of this notion in the thought and language of mankind, which even the terminology of science has not been able to avoid, affords a proof of how difficult it is for us to conceive of action and change in any other way than under the guise of activity and passivity, of a force that is exerted or of a force that is sustained. But this is the formula which in our immediate perception connects the changes of the outward world.

Here, too, it would be quite unintelligible how humanity had reached this mythology of the notion of force, which forms a well-rounded counterpart to the mythology of the gods, if the explanation of an otherwise unintelligible regular connexion between two phenomena had not appeared clear to it in these experiences, and if the psychological root of the notion of causality did not reside here, especially as regards the aspect of necessary connexion. For naïve thought, certainly, cherishes no doubt that if something is traced back to a definite force or exhibition of force on the part of something else, then that result necessarily follows—no more than it would for a moment cherish a doubt as to the necessity of the effects which are produced by its own displays of force.

Of course the phenomena which are to be explained by the notion of force must have a sort of resemblance to the changes which we ourselves produce; since otherwise the latter could not be used for their explanation. That is to say, they must succeed one another with the same regularity that certain modifications in the world follow upon the setting into activity of our representative or volitional powers, or upon our bodily movements, and we must be in a position to get some sort of direct view of the transformations, of the passing of one phenomenon into another, by the addition of some second thing. Where this for some reason or other is impossible, the naïve human being, the moment some modification appears to him of sufficient importance to be made the object of thought, again has recourse to mythology, and the activity of mysterious, invisible, personal beings is once more employed as a

means of explanation, revealing the true and primitive root of causality.

We revert here to the factor of regular succession. By itself it is far from sufficient for engendering the notion of causality, yet it is proportionately indispensable in accounting for the rise of the same. Every regular succession produces an association of ideas, and the latter gives rise to an inclination to pass from the one idea to the other, or, when the one is given, to add the other in thought. But connexion by causality is a special case of the general form of connexion of ideas by succession. What it needs is a direct intuitive view of the transformation, and of the mode of emanation of things from one another, a direct and actual perception of the propagation of one state or property into something different. In a word: in and with the succession is given coincidentally the impression of coexistence and of contiguity, and this by virtue of the above-explained analogy with the results of our own action furnishes the foundation of our idea of things as being caused by, or due to, one another in addition to the fact of their following upon one another.

Now it is a frequent saying—Hume said it and countless others have said it after him—that in no case can we have a perception of this. This sceptical assertion, however, transfers doubts of a matured scientific frame of mind to the original construction of the idea. The common man would be quite astonished if we said to him he had no knowledge of the connexion, of the transformation which exists between fire and the production of heat, glowing, and burning, or which exists between nourishment and a certain degree of strength of body, between hunger and weakness, between rain and the prospering of plants, between generation and birth, between a blow, a wound, and death. We have only to reflect on what different demands exist for evidence or intuitive knowledge according to the degree of intellectual development. Things that appear quite natural and palpable to a simple mind offer the most perplexing riddles to developed thought. Man's appreciation of the continuity of a given connexion of things has many gradations from the most superficial and crudest to the microscopically fine and mathematically exact. That fire is the cause of the burning of ob-

jects with which it is brought in contact, that it "consumes" them as a man does a meal, was perhaps never seriously doubted by any one that was not a philosopher, nor ever held by any one for a habitual connexion of two impressions which have objectively nothing to do with each other. But connexion is not in all stages the same, nor is vivid and palpable intuition always the same. For primitive man the fire-myth was vivid and palpable; as was also for the beginning of scientific thought the theory of phlogiston—a substance supposed to be contained in certain bodies rendering them inflammable and which could be consumed by fire. For the way of looking at things which then obtained, this conception was vivid enough and remained so until new observations destroyed its palpable character and showed that burning was not a consuming of matter but an absorption and different distribution of matter, and until scientists finally got to understand the various possible re-arrangements of matter and the relation of generated heat thereto. Starting from this first fundamental insight into the transformative relations of natural processes, a succession of other thoughts subsequently arose which began to remodel entirely the relation of cause and effect as it had been hitherto understood. It was disclosed, that a cause really produces nothing, makes nothing, engenders nothing, but only gives rise to re-arrangement or transformation; that between two processes which subsist in the relation of cause and effect an invariable relation of equivalence obtains which is constantly under exact control; that in all so-called becoming there is actually nothing produced but simply something transformed or re-arranged, and likewise that in all apparent disappearance nothing really disappears but a definite form, a definite disposition and arrangement of the elements of reality.

From these ideas the modern scientific notion of causality has sprung. The doubts of Hume do not apply to this notion. Hume required of the notion of causality, on the ground of its involving the element of necessity, that it should exhibit in the *single* impressions the force which bound together cause and effect. To-day we can say that this is a complete miscomprehension. Whence could this isolated force of connexion be derived which is supposed

to operate like a *Deus ex machina* between two things which by themselves have nothing to do with each other? The "cause" is force and the "effect" is force; and what is styled the causal relation is the fact that two forces are able when in contact to become transformed. This is not accomplished by means of a special force, but it is nothing else than the fact of transformation itself as related to the joint action of two forces. And this also offers us a simple explanation of why in some cases a single observation is sufficient to ascertain the existence of a causal relation between two phenomena—*videlicet*, in cases where the transformation of one phenomenon into another and the relation of equivalence between two forms of force can be rendered in some way evident and palpable; whilst in other cases hundreds of observations and the utmost regularity of succession are inadequate to this end, for the reason that it is impossible to establish that palpableness of transformation which can alone justify the employment of the notion of causality.

Scientific cognition when it asks for the causes of things is in quest of nothing but this evident and palpable connexion in which the properties of two things are mutually transformed when brought into contact. The simpler classes of these connexions are to-day quite clear to us, and the effort of science is now none other than to reduce also the most highly complicated of these connexions, such as the phenomena of life and of organic modification, to simple and immediately evident transformations. Even here the naïve conception of causality which reigned in olden times and which was characterised by the two concepts of creation and vital force or *nisus formativus*, has already begun to give way to a growing comprehension of the true connexions of this field. The history of the evolution of the plant and animal kingdoms enables us to understand the present world of organisms as the result of a long succession of transformations of organic forms throughout countless generations. For the mysterious and uncomprehended causality of creational acts has been substituted a knowledge of the chain of modifications and persistent states which have made of the developing organic world what it is—a knowledge which even now, as the outcome of an infinite aggregation of facts furnished by zoölogy, botany, and

paleontology, has acquired almost irresistible distinctness and cogency.

Evolution explains the existence, the adaptiveness, and the astonishing functions of existing organisms by the summation of minute new-formations, which fundamental living forms have assumed through constant contact with their physical environment, and also renders intelligible a large number of these transformations by pointing to the particular circumstances which occasioned them. Physiology has arrived at the explanation of the large by the small on the same road through its discovery of the cell, or the organic element proper, which leads a life of its own wherein all the vital functions can be studied in miniature. We know that the individual animal, which we are accustomed to regard as a unit, is yet at bottom a multiplicity and constitutes a cellular colony, and that the functions of the single organs like those of the animal entire, are produced by the summation of the activities of countless cells. The old physiology sought to explain the actions of organisms, the character of whose transformations were as yet not understood, by the crude notion of vital force, precisely as the Ptolemaic astronomy assumed a special *spiritus rector* for each planet—all unmistakable indications of the true origin of the idea of causality. To-day the notion of vital force, as an empty mythological phantom, has in this department also been displaced by the notion of transformation. It is becoming more and more forcibly evident in matters of detail that the organism is nothing but an extremely complicated piece of machinery which under favorable conditions regulates itself. By its specially developed power of storing up potential energy in large quantities and of transforming the same again on slight excitations into kinetic energy, it awakens the false impression that it produces force from itself without the transformation of other force. But on closer examination it is found that the transformative process can be followed step for step; for in the organism, too, that invariable relation of equivalence between the different forms of force holds good which forms in a scientific sense the type of causality.

The employment of the notion of causality in human thought

shows, therefore, a progressive development. Starting from the analogy of natural growth and annihilation with human action and creation, it appears everywhere founded on the existence of a definite connexion between two phenomena or changes which in some manner has been rendered palpably evident. The apprehension of this connexion, however, runs through all stages from the purely empirical to the rational, and from the inductive to the deductive. The contrast between mathematics and the sciences of fact which Hume pointed to, is not an absolute but a relative and graduated contrast. If it were absolute it would be unintelligible how we can make use of mathematics as a help in the study of physical things, but as this is instinctively done and with great profit to knowledge, profound analogies must exist between mathematical forms and the elements of reality, or, in other words, reality must involve rationality. On the other hand, the history of science teaches that matters of fact are always and everywhere the prime necessity,—and that even in mathematics. All elementary propositions of mathematics were first discovered as facts, that is, empirically observed, before they were deduced from axioms or were shown to be necessary. The same thing has happened with mechanics. Mechanics was originally a purely empirical science; to-day it has entered the realm of mathematics as a pure science. From the notions of force, gravitation, *vis viva*, mass, point of application, direction and velocity of motion, modern mechanics has developed a complexus of necessary truths concerning all possible forms of motion, and by means of the same physics has been rationalised throughout its whole extent,—that is, our physical knowledge, the connexions of physical phenomena, which originally possessed only a necessity of fact and were entirely empirical in character, have been converted into a body of knowledge which is linked together by the inward necessity of rational evidence and logical transparency. Chemistry pursued the same course. The bare empiricism of the old atomic theory which had been built up upon quantitative analysis and on ratios of weight and mixtures, is also beginning to give way before a deductive mode of treatment which attempts to deduce what were formerly only facts conjoined by empirical necessity, from funda

mental assumptions involving spatial and mechanical data—from varying densities, heterogeneous occupation of space and irregular concentration of masses. And how long will it be before the biochemistry of the cell likewise will explain the present empirical fact of growth and modification of forms in all its inward necessity, from the constitution and *modus operandi* of the materials imbedded in the fundamental forms of organised matter?

The immanent necessity of logical evidence is for the modern mode of view in no respect something that is restricted to geometry, as Hume contended. It is simply most easily reached there, and consequently was earliest reached there. But we cannot make a thing that is the fruit of ages, viz., the notion of the necessity of causality in the above-discussed sense, the starting-point of the developmental process. We do have a development, but it is in the contrary direction,—the necessity which was originally only a necessity of fact is constantly raised in provinces of increasing extent to exclusively inward necessity. The problems of knowledge are solved when all provinces of action and of becoming are apprehended in their inward necessity.

Fr. Jodl.

Prague.

SCIENCE AND FAITH.[1]

II. INTRODUCTION TO MAN AS A MEMBER OF SOCIETY.

MAN, as scattered over the surface of the globe in clans, tribes, and peoples, forms the subject of ethnical anthropology or ethnology, just as man viewed as an animal forms the subject of anthropology proper or zoölogical anthropology. United politically under one flag these groups take the name of nations or nationalities. Viewed as to their modes of thinking and their methods of satisfying their wants they bear the name of civilisations. Considered in the relations which individuals bear to the group as a totality they bear the designation of societies. Sociology is the science which treats of societies. There is an animal sociology and a human sociology.

Conformably to the principle laid down in our preceding article,[2] that man is merely one of the exalted, or rather the most exalted, of the forms of animal life, and that the laws which regulate his existence, the phenomena which he exhibits, and the organs which constitute his being are, *in form and degree approximately*, but the application, repetition, and development of those which we meet with in the different stages of animal evolution, we shall commence with animal sociology. This part, accordingly, will form a transition to a third and last in which we shall treat man as a member of society. It will enable us to dwell at length on certain points

---

[1] Translated from Dr. Topinard's MS. by Thomas J. McCormack.

[2] *The Monist*, Vol. VI., No. 1, October, 1895, p. 28.

which we were obliged to curtail in the preceding article. We shall divide it into three chapters: (1) preliminary biological data; (2) the animal family; (3) animal societies.[1]

I. PRELIMINARY BIOLOGICAL DATA.

Life reduced to its simplest expression is the resultant of an *ensemble* of properties or operations of a peculiar species of substance called protoplasm, which impregnates all the parts of organisms and which we meet with in the isolated state only in moners. The four first properties which must be signalised are: (1) the *oxidation* of protoplasm, which is the source of its energy or stock of vital power; (2) *excitability* or *reflexibility*, which gives rise to its actions and is the intermittent cause of its loss of energy; (3) *nutrition*, which maintains the integrity of the protoplasm and is the cause of its increase; (4) *reproduction*, which supervenes when the augmentation has reached a certain limit. The result, as regards the protoplasm, may be summed up in two words: *life* as an individual during a certain period of time, and indefinite *perpetuation* in forms similar to itself. M. Delâge adds a third characterisation: the performance of *work*. These four properties, viewed alone, are physico-chemical in character. If a particle of matter, for example, comes within reach of a moner, an excitation takes place. If the particle is nutrient in character, the pseudopods of the moner will be extended, its cilia will be set in motion, and the nutrient particle will be engulfed. There is nothing mystical in this performance. A property merely is put into play—a reaction succeeding an excitation. At most we might say that the centrosome acted as the centre of attraction.

But reduced to their ultimate properties protoplasmic substances are simply inert bodies—admirably constructed machines operating in an analogous manner but without coal or actual materials to work upon. Their impulse and direction are furnished by outward stimuli. They are constrained to respond to the commands

[1] The first two of these chapters constitute the article in the present *Monist*. The third will appear in October, and the concluding *part* in 1897.

imposed upon them, to put themselves in harmony with stimuli offered, in a word, to obey the exactions of their environment agreeably to the law of necessity, and on pain of death to accommodate themselves to the conditions of existence in which their lot is cast. Hence results a fifth property of protoplasm—that of *adaptation.* Three factors unite in insuring the perfect action of this property. (1) The plasticity of protoplasm, the result of the joint action of its reflexibility and nutrition; (2) its slight variations, with the consequent chance of modification; and (3) its capacity for transmitting new peculiarities. A word as to the first two of these. Simple and regular as the vital acts of protoplasm *per se* may be, they involve nevertheless more or less perceptible differences. Nutrition has its irregularities. The nutrient particles are not always seized and ingested at equal intervals of time nor always on the same side. The elaborated products are not always disposed with perfect uniformity from the circumference to the centre. *Variability* thus appears a primitive property. As to transmission, or *heredity*, it is involved in the fact of the reproduction of individuals like the parent protoplasm, as it exists at the moment. Thus we have another primitive property.

Nor is this all. From the union of all these properties, now numbering seven, but more particularly from the growth of the protoplasm, from its repeated reproduction or multiplication, and from its adaptation, results not the last, but the most fecund and the most general, of the primitive properties of protoplasm—its power of indefinite development, that is evolution.

Evolution! Without which living beings on our planet would never perhaps have emerged from the unicellular state, and which has caused the growth from the protists, of the vegetable and animal kingdoms, and of the vertebrates and man; titanic power always in action, always alert, profiting by the least circumstance, yet whimsical, capricious, seemingly groping and without set purpose,[1] em-

[1] The sole objection to this manner of conceiving evolution is that which I have already set forth in my *Elements of General Anthropology*. Certain organs, or arrangements of organs, certain functions are alike, or are developed in the same direction, in different branches of the animal tree, although the common trunk from

ploying the most insignificant means and neglecting at times the most direct, pursuing different lines in its advance, curved lines, straight lines, crooked lines, parallels, divergents, yet frequently arriving at the same result, limited only by absolute impossibility for the time being, having but one guide, that which is good and directly useful to the individual, and but one sanction, success! Was not that what the divine author of Genesis strove to express when recounting how the heavens and the earth and the plants and the animals had been created, he stopped at each stage, and before continuing said: "And God saw that it was good."

The first results of evolution affect the interior of the protoplasm. Granulations, a nucleus in the vicinity of the centrosome, one or several vacuoles, perhaps filaments, make their appearance there. The moner has become an amœba, which is classified as a protozoön or a protophyte, according as it leans towards the animal or towards the vegetable kingdom. Some years ago a considerable group of homogeneous protoplasmic bodies without nuclei were supposed to exist; but the increasing power of microscopes has steadily reduced the number of these, and we are now constrained to conclude that few primitive protoplasmic bodies have come down to us. The following effects of evolution relate to the exterior: the pseudopods, the cilia, the vibratile filaments, the various irradiations, the more or less viscid envelopes, and even the calcareous or silicious teguments, which other divisions of the kingdom of protists present.

But the decisive stage in this distant epoch of the history of the animal kingdom is that which turns to account a final and hitherto latent property of the protoplasm, its power of blending or aggregation. This occasionally occurs in the protists. Protoplasmic bodies, with or without nuclei, born by the ordinary method of scission, adhere by their pseudopods to the bodies which have engen-

---

which they have diverged presents no trace nor prophetic germ of them. To this I reply that these organs or functions being good and useful, it is natural that evolution should have led up to them several times by different paths. It is thus that prehistoric men, not in communication with one another and of different races, have independently invented flint-edged instruments or erected menhirs.

dered them, or detach themselves therefrom, to form afterwards aggregated masses. Others having been left at liberty for a time, encounter one of these aggregates and join it. Thus appears at the beginning of our research this grand property of association whose fortunes and development we have now to follow. By virtue of it the metazoa succeed the protozoa; multicellular, unicellular beings. By it, all the numerous animals that inhabit our planet have been built up from the simplest to the most complicated, progressively to the vertebrates and man. Association, and adaptation by differentiation within the associated groups, are undeniably the two most potent factors of evolution.

Without inquiring into the relation which the species of association now under discussion, which is at once morphological and physiological, bears to that which we encounter under the specific name of *societies*, we will continue our investigations and cast a glance at the phenomena which the first kind offers.

The first aggregates, the so-called animal colonies of naturalists, were undifferentiated. All the cells were alike and constituted so many distinct individualities arranged in simple juxtaposition. Upon their first entrance into the kingdom of the metazoa, where henceforward they bear the name of plastids or anatomical elements, these cells were placed in conditions of life, which varied by reason of their different situations within the aggregate, and each cell was constrained to adapt itself to this situation. The first differentiation of their mass and the one which was most urgent, was effected at their centre, where a digestive cavity arose; the next was effected in the walls of this cavity which were doubled, the external layer being in contact with the circumambient medium, and the internal layer with the water which penetrated the cavity, both acquiring the special character which their functions demanded. Olynthus, a primitive sponge, is an example. The second adaptation is in the various forms which this primitive plan is led to assume according to the circumstances of its condition, becoming elongated or ramified as it is in polyps, or taking some other form. One of the extremities, that which is in contact with the ground, becomes attached to the ground; the other, the free extremity of the cavity,

or digestive tube, provides itself with tentacles and becomes the mouth. The primitive cells, conjoined in groups, have thus given rise to distinct sorts of individuals which have been denominated according to their functions, digestive, prehensile, fixative, etc. Quatrefages has counted as many as seven kinds, not including the cells of junction or indifferent cells, which in some polyps are formed in sheets.

So far we have had nothing but the application of the grand law of necessity: adaptations to the conditions of the environment or death. Every plastid or group of plastids is subject to the exigencies which its situation brings with it. Morphological differentiation, that which is most favorable to the tasks imposed, is spontaneously effected. Every group is individualised in the functions which are allotted to it. Each has lost in a corresponding degree its ability to discharge other functions, and has been supplanted in their performance by its neighbors which it in turn has supplanted in theirs. Some of the cells of the community have obscure parts to fill. The parts of others are leading, and necessarily the latter take the supremacy. The inequality between the members of the colony is striking, but it is in the interest of the common weal. Solidarity is the result,—a solidarity which cannot help augmenting at the expense of all the individuals, but especially of the less useful, and which tends to culminate in the general unity of the whole. When this point is reached, our adapted and solidarised[1] colony forms throughout all its parts a single organism only,—an individual which has taken the place of all the old, minor individuals which are now fused and lost in its midst. This is the *meride* of Prof. Edmond Perrier.

The animals comprised under the designation merides are all metazoans, more or less low in the scale. Their young migrate and become fixed elsewhere, or live at liberty, or adhere together, thus laying the foundation of a new species of colony of the secon-

[1]At the suggestion of M. Topinard we use throughout this article the words *solidarise*, *solidarisation*, etc.; no existing English words have the exact meaning of the French equivalents of these neologisms, which have their justification and their analogue in *solidarity*.—*Tr.*

dary degree, the members of which pass, or at least may pass, through the same stages of development. The colony augments and is differentiated; its parts become consolidated, and the whole again forms a single organism, a colonial individual. This is the *zoöid* of M. Perrier.

In their turn, these zoöids lead independent lives as distinct and ambulatory individuals, or they gather together in groups and by coalescence give rise to colonies of the tertiary degree. More complex adaptations than the preceding, yet analogous thereto, arise. The parts not only adapt themselves to the external conditions, but also to one another. Fusion, atrophy, and overlapping of organs result. Solidarity and harmony are established, and the result is again a single organism—the *deme* of M. Perrier. The higher invertebrates and all the vertebrates are demes. The human organism is a deme, that is to say, a consolidated colony of zoöids or zoönites of which the initial cellular aggregates are represented by anatomical elements.

Merides, zoöids, or demes; colonies of plastids, of merides, of zoöids, or of compounds thereof; colonies of elements of what degree of individualisation or solidarisation soever, all depend on the varied conditions of existence in which they are placed. In the higher animals the factor which seems to have the most influence is food. In the lower and middle invertebrates, it is difference of habitat and hindrances placed in the way of free development of parts. The animal is fixed or natant; it crawls about in the water, in the mud, or creeps about upon the earth. Of all the circumstances most favorable to its evolution and perfection, the first, beyond dispute are unrestricted liberty and struggle of the liveliest sort. Fixed colonies, says Perrier, never become completely transformed into individuals. Colonies which at liberty have attained a certain development, retrograde if they become fixed. Such is the predicament of the ascidians, which through having immobilised themselves have fallen from the rank of vertebrates to that of worms; and it is also the case with anatifa, the stalked barnacle, which is a degenerate crustacean. Among the causes which produce deviation of development is the formation of squamous valves, of a tubular

or spiral calcareous case—the compressed parts atrophying. Another cause of deviation is parasitism. Certain zoöids or colonies of zoöids, on coming into media where life is easy and food constantly at hand, lose nearly all their organs except their digestive tube, and are practically reduced to the apparatus of reproduction. Slave-holding ants, becoming wholly incapacitated for self-support, die when deserted by their slaves. And yet these degenerate species on being restored to favorable habits regain their power of evolution in any direction. This is universally the case with ascidians. When they have attained their liberty they give birth to exuberant colonies called pyrosomes.

There is left us from our survey this fundamental fact. If evolution is to be profitable, progressive, and productive of its best results, the individual must conserve its full liberty, must possess its full power of reaction; in other words, for obtaining the normal play of the conditions of existence, no hindrance must be interposed. As the economists say: *laissez faire, laissez passer.*

In sum, evolution beginning with primitive protoplasmic bodies, has produced the metazoa by following five directions and proceeding from five sources. As enumerated by M. Edmond Perrier these are as follows: the larva of the sponges, the planula of the polyps, the gastrula of the echinoderms, the nauplius of the arthropods, and the trochosphere of the worms, from which are descended the vertebrates, and consequently man. This gigantic work was accomplished during untold ages substantially by means of *association* with its attendant consequences—division and specialisation of labor, functional and then morphological differentiation, reciprocal adaptation of parts, and finally their solidarisation, culminating by progression in unity.

Let us return to one of the primitive properties of protoplasm, to its excitability or reflexibility. In fact, this may be subdivided into two properties, as the preceding designations indicate. An infusory or organic debris passes in front of a moner and an excitation is produced: the matter is seized; this is reflexibility or reaction. Subsequently, on the protoplasmic substances or cells becoming aggregated, these two properties are combined and pass through the

same stages as association. Like the latter they are differentiated according to position and according to needs. They partake of the fortunes of the different groups or individuals, which are here digestive, here reproductive, there nutritive, and there prehensile. They become severally strengthened in their distinctive characters, and appear in various forms. Excitability becomes buccal, visceral, tegumentary, exploratory, locomotor, or general sensibility. Reflexibility is made to harmonise with different sorts of corresponding reflex movements.

But physiological differentiations cannot persist without being followed by morphological differentiations. In the protoplasm or cell there is nothing material to indicate a differentiation of the two properties. At a certain stage, the repetition of the same impressions and of the same acts forcibly compels certain plastids to adapt themselves to the double rôle, and thus gives the impulse to their transformation. Thus are born, at this spot and at that, the first nervous fibres and nervous cells—fibres for the transmission of impressions or reactions, and cells as an intermediate focus of reflex action. This step accomplished, the rest proceeds of itself. The cells by association and multiplication become ganglia, the fibres nervous cords. The most active, the most necessary ganglia assume the hegemony. Each meride, each zoöid in a radiate or linear colony has its own ganglia. Their mutual adaptation is accomplished in the most favorable manner agreeably to the principles of necessity and economy; the superfluous ganglia disappear, others are newly formed, communication between them is strengthened. In short, the first type of a nervous system of high solidarity arises—the type which I call *ganglionary*, and of which the higher arthropods are an example.

A delicate question arises here. Where, when, and by what mechanism is the sense of personality formed which inheres in the merides, zoöids and demes—that is to say, the ego?

We have seen that the second property of protoplasm resolves itself into an excitation followed by a reaction. All inquirers do not look at matters in this simple light. A moner or an amœba presents itself to the observer under different aspects. It is immobile and

has its pseudopods more or less extended or contracted; it roams about, impelled by influences wholly beyond our power of detection; it circles round a chance infusory or organic debris which has strayed in its path; and finally, when the latter has come within reach, it lengthens out its pseudopods and seizes it. In these phenomena, which are certainly rather complicated for so simple a being, some observers have seen intention, memory, and will, in a word have discovered in them an ego, obscure though it be. Others have held, and experimentally proved, that the property of performing movements, and particularly of lengthening and shortening pseudopods, can be effected by various physical and chemical agents. Shaking the water in which an amœba is immersed, touching it with a blunt needle, causes slight contraction of the pseudopods, and if the operation is repeated, marked contraction. At a temperature of 35° C. or thereabouts the movements of the amœba are exaggerated to the point of rigidity, below this they are normal, and lower still they are much weakened. Light is without action on amœbas but it causes bacteria and diatomes to run from its presence; a fact, parenthetically, which marks the degrees of development of motility in protists. Among chemical agents some attract, others repel amœbas; some excite, others destroy their movements; anæsthetics have the last effect. Oxygen stimulates their movements and its suppression stops them.

From these effects, to which those due to electricity might be added, it is permissible to conclude that protoplasmic bodies obey in a general manner the same influences that living matter much further up in the scale obeys. But they do not prove that the movements normally produced by natural stimuli, as by the passage of an infusory, are necessarily directed by any sort of centrosome. When a mineral with an avidity for oxygen discriminates and picks out that oxygen in a medium containing nitrogen and carbonic acid, we do not say that it exercises choice. Amœbas have been observed to perform the same movements in engulfing substances unfit for nutrition, such as fragments of hair, for example. An amœba which makes for an object or circles round an infusory, may be simply obeying the excitation which imperceptible disturb-

ances in the water produce. If we attribute an ego to the simplest protists, by way of a preface to the ego which exists in high orders of metazoa, it would be incumbent upon us also to attribute it to sensitive and carboniferous plants, which would certainly be extravagant. And yet, if we grant the existence of individuality in unicellular beings, and that cannot be a subject of doubt, it is difficult to refuse to them a corresponding *sense* of individuality. The preferable course would be to admit that in the kingdom of protists, particularly before their differentiation into protozoans and protophytes, the properties of protoplasmic bodies, viewed singly, are of the physico-chemical order, that life is their result, but that the ego in however infinitesimal a degree we may assume is not yet existent,—in other words, that the movements in question may be classified as mechanical reactions following mechanical excitations. With this reservation, and for brevity of description, we shall not hesitate to make use of the word ego as a synonym for the virtual centre of individuality.

In the initial associations, the cellular individuals being all alike, there is no change. But when groups are formed, collective individualities, having a definite value, are constituted, each being in relation to particular functions of the group. From these spring and are to be distinguished a like number of *partial egos*, which busy themselves only with what immediately concerns them. Those buried in the depths of the aggregate interfere only in the obscure phenomena of digestion. Those which are superficially in contact with the exterior world are incessantly alert. The operations of the one set are restricted to a domain of limited interest, those of the others extend to important organs designed for the capture of prey and for its prehension, for attack and for defence. Naturally the latter attain a greater development. So long as the groups are not united by nervous elements, these egos will remain isolated and will sustain no relations with their neighbors, except through shocks mechanically transmitted from place to place. But as soon as the ganglia have centralised the individuality of each group, and as soon as the nerves have put them in mutual communication, each will take what is its due, a hierarchy will be established and the

responsibilities be divided. There will be the particular interests of each partial ego, and the interests of those charged with the dominant functions and the general welfare. Each will have its independence in its own sphere, but in certain circumstances all will be solidary. Solidarity, however, implies some sort of general and higher ego.

In the generalised ganglionary period, at which we now are, acts are always reducible to an excitation followed by a reaction, but with the three following complications: (1) the conversion of the excitation into movement is no longer effected at the spot but in the nearest ganglion; (2) the ganglion discriminates between the different kinds of excitation and responds by simple or co-ordinated movements varying with the excitation; (3) the excitations occasionally pass beyond the ganglion and spread in greater or less degree to others. Suppose an impression is produced on the antenna of an insect. If it is slight, it will act locally on the cells or tissues, and the extremity of the antenna will wrinkle. If it be increased, it will be reflected to the nearest ganglion, and the antenna and jaws will be set in motion. If it is strong, the entire animal will respond to the reaction. Does an ego intervene in this last case? If the co-ordinated movements have already been produced and repeated under the same conditions and a habit has resulted, then this assumption is useless. But if the impression is novel, if there is occasion for a modification of the act, in a word, if initiative is needed, then necessarily an ego must intervene. But where on this hypothesis is its seat? In one or in several ganglia together? I conclude in several. Morphological unity does not exist as yet in the ganglion of the insect. The insect has its sense of individuality, it discriminates what is parcel of itself from what is extraneous to it. It has its subjectivity, but this subjectivity, its ego, is diffuse. All the facts set forth by Sir John Lubbock in his work on bees and ants, and by other authors who have written on this subject, confirm this conclusion.

At some unknown period in evolution a grand advance is made in the nervous system. A series of ganglia arising from the zoönites of a linear colony are fused into a long cord, the spinal cord of

vertebrates. We know of no living animal limited exclusively to this organ, excepting the larva of the ascidian and amphioxus. But physiological experiments on ordinary vertebrates have indicated what would be its functions. In this hypothetical organism certain impressions will be converted into movements by scattered ganglia in the viscera and along the paths of the nerves; others, more intimately connected with exterior acts, would have their centres of reflex action and of co-ordination in particular zones of the cord; those which play a controlling part and induce modifications of the preceding movements would end in the sensorial ganglionary net of the cephalic extremity of the cord. We say in the net, because everything leads us to believe that the ego is as yet diffused.

The last and greatest progress is accomplished when around the sensory ganglia of the extremity of the cord a proliferation is produced of the cells and nervous fibres, which gives rise to the cerebral hemispheres. Henceforward there is no more doubt, the centralisation of the ego is effected, it has found its true expression; seemingly the ego has been transported from the cord to these new organs, but it is so only in appearance. It is a new ego, *sui generis* and intelligent, that has been formed. The ganglia of the body continue their organic rôles and maintain their petty individualities. The cord fulfils the same functions and also preserves its powerful individuality. The hemispheres are simply a superadded organ—the organ of thought.

Ganglionary animals (Insects, etc.) do not think; they reflect impressions, by associating or not associating under given conditions the action of several ganglia. Animals having hemispheres, that is to say, vertebrates, alone think. Rudimentary thought at its beginning in the lizards of M. Delbœuf, in the crocodiles of the Nile, and in fishes generally; having less value perhaps at this period than apparently it has in certain ganglionary animals; but already reaching considerable heights in the birds and the mammals, attaining its highest in man, and always proportional to the diverse morphological factors of which it is the result! Through it, the ego of the hemispheres intervenes, occasionally, and at its leisure, more or less conscious of its motives of action, suspending, accelerating,

or modifying the co-ordinated acts relating to its exterior life, of which the cord still remains the centre of production. The scattered ganglia have their habits, the results of the repetition of the same acts confirmed by time; the cord has its habits; the hemispheres have also their habits, but of a different kind. The hemispheres alone when their attention is sufficiently solicited, when the interest, pleasure, or caprice of the individual is at stake, and when they will it, are able to alter their own habits and those of the cord. They alone represent the reasoning ego.

It follows from this examination that the ego, such as we have experience of it in ourselves, is the final product of a long evolution which can be reduced to four stages. In the first, or in the solitary cells of the protist kingdom, it existed merely in a potential state. In the second, or in the non-solidarised colonies, it was presented in the form of partial and scattered egos whose sphere was restricted to the special functions with which the group that each represented was clothed. In the third, or in the solidarised colonies of the generalised ganglionary type, it had its seat in a diffuse form in the main regulative ganglia, and as yet furnished but a vague sentiment of general individuality. In the fourth, or in the vertebrates, it is housed in a special organ subsequently superadded; here it had its modest birth, developed little by little, and ended at the summit of the scale by becoming the mighty ego of man.

Virtual, diffused, or centralised, its rôle in all animals is to afford individuals the sentiment of their conservation, of their needs, and to force them to obey the injunctions of nature on penalty of annihilation. In its highest degree it comprises memories of the past, acts, sensations, and thoughts, the sum-total of its internal and external impressions; it gives to the individual the sentiment of its present corporeal existence and the notion even of its faculties and intellectual operations: *cogito ergo sum.* Animals provided with hemispheres alone think; man alone knows that he thinks. The ego is the consciousness of self—it is the soul.

Let us go back to the first law, not of life, but of the conservation of life in individuals, be it protoplasm, cell, meride, zoöid, or deme—the obligation to conform to circumstances, that is to satisfy

their needs while yielding to outward necessity and acting in the best interests of the organism. The partial egos had control of the individual functioning of each group or organ to which they belonged. The diffused ego, predominating in certain ganglia, was charged with more general interests, such as related to the exterior world. The centralised ego was established to look after the same interests but was vested with more authority. This is its whole part. It distinguishes what is external to it from what is within the sphere of its interests. The external world is indifferent to it, according as it does not or cannot affect its existence. It has no other concern but to perceive and foresee. It refers all things to itself; it is zoöcentric, that is to say, egoistic. We cannot conceive of a unicellular or multicellular animal that is not egoistic. It is the very essence of individuals. It remains to be seen whether this egoism cannot assume different forms, and whether it is not subject to differentiation according to the law controlling all properties, functions, and organs.

The acts of animals always involve conservation. In the protoplasm or cell, in the sponge or the polyp, before the nervous elements have made their appearance, it is contained in the good which results therefrom for the organism and in the evil which is avoided thereby. The good is useful to the individual as the bad is harmful. Later, when the first nervous elements have appeared and sensibility has become established, the impressions are distinguished into pleasurable and into painful; all partial egos, be they inward or superficial, are aware of this distinction, each in the matters which concern it. These impressions at a given moment become accentuated, constitute actual feelings of pleasure and pain, and remain henceforward the criterion *par excellence* impelling the animal to act in this or that direction. The diffused ego of crustaceans and of insects, scarce holding predominance in certain ganglia, has certainly no other immediate guide. The ego of the vertebrates centralised in a special organ is in the same predicament: impressions of pleasure and of pain coming from the periphery or awakened in the hemispheres by the recollection of prior impressions are the determining causes of reactions. Here a new factor intervenes.

To avoid immediate pain, to experience immediate pleasure and by means thereof to obey the direct injunctions of the external world has been hitherto the sole motive spring of action. But the ganglia, the spinal cord, and particularly the hemispheres have become complex organs endowed with new properties, the result of differentiation. They no longer restrict themselves to brutally responding to present peripheral sensations. The impression agitates the organism in its entirety, awakens prior impressions which memory has stored up in latent forms; the response need not be that which the impression of the moment demands, but that which awakened prior impressions prefer. We have here an association of impressions as in a different sphere we have an association of ideas. Actions are most frequently the result of such a process. And hence we arrive at a second formula—the shunning of circumstances wherein previously pain was produced and the seeking those in which pleasure was felt. The lizards of M. Delbœuf creep into their keeper's hand in order to find there the agreeable warmth which they have experienced before; they allow themselves to be caressed because the passage of his hand over their rough skin has previously occasioned them pleasure of which they preserve a lively recollection. The crocodile who flees when he sees the stick with which he has been struck, obeys the impression aroused by the present impression and not the present one itself. Animals generally are led thus to approach individuals of their own and other species who have never done them harm and with whom are associated recollections of pleasure. They return to such persons and acquire the habit of doing so. This custom being repeated from generation to generation, a particular sentiment is formed, increases, and the habit thus established becomes a need—the need of living with others, sociability.

A remark as to the advantages procured by this life in common. The animal is less frequently attacked by his habitual enemies; he has a chance of concealing himself in the mass of his fellows in times of danger; one or another of his companions possesses qualities by which he may profit. His interest and pleasure combining to start him on this path, this animal will, unawares to

himself, gradually come to love his comrades. On occasions he will represent to himself their joys and their sorrows, will endeavor to feel and to share them. As the sight or memory of delicious morsels makes his mouth water, so he may be led to shed tears, as seals do. At the right moment he will run to the aid of his fellows, will perhaps forget his own personality to save them, and may be capable by reflex instigation of the most praiseworthy devotion. It signifies little that the habit has grown up progressively without his suspecting it; that the first cause and the secondary causes were the pleasure felt; that the personal interest of the organism was the direct or indirect motive. The unconscious sentiment which responds to it is designated altruism. Sociability and altruism are joint terms. They imply mutual concessions, advantages mutually tendered, and consequently a lessening of egoism. This latter is the love of self, altruism is the love of others, in various but marked degrees.

The difficulty is that the two frequently come into conflict; that personal interest, the first by birth, is of the essence of personality and has anteriorly contracted deep-rooted habits which never lose their hold; that the altruistic habits which are born subsequently are more feeble and less direct; and that in all struggles the first have the advantage. The life of animals like that of man daily offers examples of this conflict. Happily for altruism the animal is extremely spontaneous. He thinks little or only obscurely before acting. He readily abandons himself to secondary automatic impulses. Habits are his second nature, they are multiple and conflicting; the animal obeys the strongest at the moment, according as circumstances favor the one or the other, or as reflexes of this or that character intervene with more or less rapidity. The animal, like man, frequently yields to temptations which can only involve him in pain; sacrifices a useful act for some immediate pleasure. He has his passions, and is subject to all the forms of nervosity, some coming from his egoism, others from his altruism. But when equilibrium has been restored, when the individual has gotten possession of himself again, when he has recovered the sentiment of his conservation, and the memory of the pains and pleas-

ures consequent upon his acts, when he is put in a position to choose,—his ego, that is to say, his true interests, once more regain the upper hand and direct his conduct.

Certain peculiarities of the animal organism of vertebrates reenforce the predispositions to sociability and altruism as just described. One of the most remarkable characteristics of life is its property of extending itself, of propagating itself like the flames of a conflagration, of multiplying, and of never being fully satisfied in this regard. This, properly speaking, is the primal cause of evolution. Every cell increases, every organ augments, every function expands proportionately to its activity. This exuberance in the young, where anabolism predominates over catabolism, to use the jargon of the day, engenders an excess of muscular activity which requires expansion and of which one form is the need of play. Insects often show traces of it; it becomes marked among the fishes and reptiles, and is quite pronounced in birds and mammals. The Felidæ and Canidæ run, gambol, wrestle, caress and maul each other from sheer joy. The life of monkeys is passed almost entirely in play. Although this need diminishes in adults and disappears among the old, it could not help contributing strongly to the formation of groups. The same exuberance of life impels animals to be noisy, if I may so generalise the idea. There is the so-called cry of insects, the croaking of frogs, the singing of birds, and the various means of communication which obtain among animals. But these manifestations of activity on the part of certain organs are contagious through imitation; they draw auditors and solicit admirers. There is no doubt but this factor has contributed largely to establishing *rapprochements*. If we wished to adduce the case of man, the proof would be easy, but it is sufficient to recall to mind the case of birds, of nocturnal carnivora, and of certain monkeys.

The same exuberance of life has resulted in the irresistible need of testing the range of one's power, and of making extensive use of it, of directing one's actions to surrounding things, especially to animated nature, and particularly to one's fellows. This is the impulse of appropriating prey which has been captured, of taking

possession of the caves used for shelter, of the territory of the chase, or of the pasture to which one is accustomed; it is the need of exerting one's authority, of subjecting, of protecting, of reigning, and even of tyrannising.

But if there is exuberance of life and sense of force in some, on the other hand and comparatively there is the sentiment of weakness and the need of protection in others. Indolent, slothful, or really inferior, these feel themselves incapable, less fitted to cope with circumstances, to supply their needs, to defend themselves; they require assistance, protection, participation in groups where they are less isolated. Hence arises the natural division of individuals, as of species, into the strong and the weak, the protectors and the protected, the courageous and the timid, into individuals predisposed to egoism and to combat, and individuals predisposed to altruism and to quietness. This distinction exists in their life as a whole as well as in that of sex. The male is strong and exploits his power, the female is weak and yields in her weakness. These two factors—directing and being directed—are extremely influential in the formation of social groups.

It would be supererogatory to remark how these various springs of action, which are ultimately reducible to two,—the need of affirming and of satisfying one's ego and the need of taking possession of the non-ego,—must necessarily exert a powerful influence on the development in animal societies of likes and dislikes, passions and active or sensitive faculties. Egoism and force engender emulation, the desire to do better and more, self-love, pride, jealousy, hate, the spirit of reprisal. Weakness inspires submission, sympathy, recognition, suffering, fear, love. But we must not enter on this subject, as it would carry us too far.

Let us recapitulate:—egoism is the expression of the centralised ego. It is love of self. The need of a large life, with a maximum of pleasure and a minimum of pain.

Altruism in its general sense is the love of what is outside of self, or, to be more precise, the love of that which promotes, or tends to promote, the welfare of self. Nevertheless, the word in its particular sense applies only to fellow or kindred creatures.

Altruism is a differentiation of egoism. We ought to say—the altruistic *interest.*

To be in connexion with the exterior world, to receive exterior excitations, and to multiply the sources of enjoyment which they afford, is a need of the organism which grows in intensity according as the central sensibility is more developed in the individual and in the species. It leads to the need of living with one's fellows, or to sociability.

To seek assistance and protection, to share difficulties, to desire much and give little, is the characteristic of personal interest. It also leads to association.

The ego and the association of egos are the two poles of evolution. In the merides and zoöids the egos are weakened by the progress of solidarity. In the demes, associating under other conditions and under the name of animal societies, the egos maintain on the contrary almost their entire independence. But is this detrimental to the solidarity? This we shall discover by degrees.

* * *

A few words, before continuing, on reproduction. It is of two kinds—asexual and sexual. In the first, a part of the individual separates by scission or by gemmation; in the second two elements, differentiated in opposite senses, unite into one. Reproduction by scission is peculiar to individuals formed of a single cell; it is to be met with, however, among certain merides or zoöids, such as Medusa, Asterias, and Microstoma. In the latter it furnishes the key to the formation of linear colonies. It is maintained in the vertebrates in particular cases and for the multiplication of anatomical elements, like the cells of the epidermis and the cells of the glandular secretions. Reproduction by gemmation is a second stage of asexual reproduction. It is peculiar to the lower invertebrates, where it multiplies individuals, completes colonies, and frequently alternates with sexual generation, which tends more and more to take its place. Sexual reproduction is the definitive stage. It becomes established as the types get fixed and determinate species are constituted. Elementary in some protists, it becomes more common in the lower invertebrates and is generalised in the higher

invertebrates and in the vertebrates. It consists essentially of the co-operation of two different cells, one male and one female, which are blended into one, possessing the combined latent characters of both. From the protozoans to man all gradations of sexual generation are observable.

At first, there are two cells, presenting no appreciable differences, but which meet, exchange parts of their nuclei, and then separate to continue independently their existence and to reproduce by the ordinary process of division met with in unicellular organisms. It would be opportune to ask here, what the utility is of such a union, which apparently effects no change? These two cells, it is asserted, have severally exhausted their capability of division and have nothing left but to die until the exchange which is made rejuvenates them and renders them fit to pursue a new career. In the second stage, two cells, still alike, blend totally and form but one, which reproduces the type of the common parents. Here, some will add, teleologists no doubt, that the divergent characters are neutralised in this manner and that the common characters, being better transmitted, assure the perpetuity of the type. Be it so. But that does not suit with the theory of Weismann that the differences between two copulants alone produce the variations of type which natural selection subsequently makes use of. In the subsequent stages the two cells become gradually differentiated morphologically and take on the characters of their respective sexes. The female is large and passive, the male is small, lively, and flagellate. Subsequently the profound phenomena of fecundation are exhibited and the fecundated ovum pursues its ontogenetic evolution by reproducing in epitomised form the phases through which has passed the phylogeny of its parents.

Here a difficulty arises, touching the conjunction of the two sexual elements. At the start in the metazoa the two reproducers are individuals, differentiated in opposite senses but belonging to the same colony; the distance for meeting is short, chance favored by currents produces the conjunction. For some time, in radiate and lineal colonies, the sexes continue thus united in the same individual, which is styled monœcious. But gradually they get distrib-

uted on different individuals. A succession of cases shows the transitions. Thus, one individual is hermaphroditic and plays in juxtaposition with another the rôle of both male and female simultaneously, and afterwards successively. When in these conditions one of the rôles is weakened, the corresponding genital apparatus becomes atrophied and the individual remains either male or female as the case may be.

All vertebrates to which we limit ourselves, are bisexual. In a very early phase of evolution the female restricts itself to depositing its ova in places where they are afterwards fecundated by the male. Neither the one nor the other is solicitous as to consequences. The young break their eggs as best they can, immense numbers perish for want of care, but the prodigious fecundity of the female compensates the losses. At this point evolution seems to hesitate as to the direction which it will follow. In some fishes and batrachians the male takes charge of the eggs, but this care does not extend to the young. Selection, the supreme judge of the value of the path followed, has pronounced itself against this system. Then appears the second phase in which the responsibility for the eggs and the young falls entirely upon the female. This is evidently the procedure which best assures the perpetuation of the species. Adaptation to necessity has acted wisely. But is there not corresponding to this specialisation of the final phases of reproduction in the female some useful complement, some assistance on the part of the male who has co-operated in the initial operation? In some invertebrates he dies after having fulfilled his task; in the vertebrates he lives. And here intervenes an instinct, a special sentiment, which is to the general function of reproduction what the ego in egoism is to the general function of relation to the external world.

The germ of this instinct is discovered in the fecundation of the very lowest beings. The attraction which leads the female cell to the male cell is visible: the one rests immovable, the other advances towards it, and before union gives evidence by its movements of genuine agitation. In some fishes, less indifferent than the general run, a like agitation called rut or heat is observed accompanied at times by concomitant and diverse physiological phe-

nomena, such as a change of color of their external scaly integument. It leads in some reptiles, and then in all birds and mammals, to the phenomena of copulation.[1] But at this stage is awakened in the female a sentiment of a quite special character and without precedent in the phylogenetic line. There is an obscure presentiment of it in certain reptiles, and it reaches its highest expression in the birds and the mammals. It is the sentiment of the proprietorship of eggs and of the young—*maternal love*, one of the most admirable creations of evolution. A similar sentiment is developed in the male, but obscurely and laboriously, being subject to numerous exceptions here, and varying from zero to perfection. After rut the male becomes attached to the female, protects her, and transfers his cares and affections to the little ones which are born from her. From the sexual union of the two results a family union which generally lasts until the young are able to take care of themselves.

Such, rapidly sketched, are the phases which beginning with the differentiation of the sexes in the first cells have led to their separation in individuals and, in this, from complete indifference to offspring to association in families having in view the training of children. It remains for us to pass on to the facts.

II. THE ANIMAL FAMILY.

Whatever may be our attendant regrets, for the subject is interesting particularly among hymenopterous insects, we shall pass by the invertebrates and confine ourselves to the vertebrates, a province sufficiently vast in itself. Three forms of association are presented to us, the first intermittent, between two individuals of different sexes, with a view to reproduction; the second, eventual, between two or several individuals, with a view to mutual assistance and companionship; the third, temporary or permanent, under the form of assemblages or societies.

We shall commence with the first and devote some space to it.

[1] Some fishes, it has been observed, already present phenomena of interior fecundation.

The facts involved are of a special nature; they are either mingled with or alternate with those which refer to societies, and they render the latter facts obscure; the family in which they culminate is regarded rightly or wrongly as the foundation—the formative cell, as it has been called—of societies. There are disadvantages attending the separation of the two subjects and there is danger of repetition; but the drawbacks are outweighed by the advantages.

The Fishes come first. They are divided into two groups. The first is that in which the young are born alive and where there is interior fecundation, and the second is that in which the female lays its eggs in some place, selected or not selected, where they are fecundated by the male. The majority of cartilaginous fishes and some bony fishes belong to the first class. The others, which constitute the great majority, belong to the second. Among the first a certain degree of maternal love apparently exists. A female plagiostome has been observed swimming in company with her young, which she would not abandon until they were able to look out for themselves. In the second, considerable variation is noticeable. At first there is complete indifference; the female lays, but evinces no further concern for, her eggs; the male passes over and fecundates them but likewise exhibits no solicitude for their fate. But at times a certain attraction is manifested between the two sexes without copulation. The female when laying her eggs is followed by one or several males. An agitation analogous to that of rut has been observed in the male, its object being either the female or the eggs laid. This rut proceeds so far as to occasion combats between rivals. The male conjointly with the female, or alone, prepares a sort of nest. One or the other, or both, watch over the eggs. I have seen in the aquarium at Naples a fish living with a female companion and even exhibiting extreme jealousy. The most curious case is that of Gasterosteus. It very carefully and by its own exertions constructs a cylindrical nest; to this it conducts a female and expresses its joy while the latter is laying her eggs, whereupon it goes in search of another; it then walls up the entrance to the nest, watches over the eggs until they have been hatched, and defends them against females which visit the place with the intention of de-

vouring them; finally, it takes care of the little ones and does not give them their liberty until they have no longer need of its protection. Other and more astonishing cases still are the following: that of several male Lophobranchii, who harvest the eggs and taking their station directly upon them protect them until they are hatched; that of Hippocampus and Syngnathus in which the eggs are kept in a ventral or caudal pouch; that of two or three species in which the male hatches the eggs in its mouth.

Sent living into the world, or hatched by themselves, the young of fishes, consequently, are abandoned and perish in large numbers on account of lack of care. But the prodigious fecundity of the majority compensates this loss. The salmon lays nearly twenty-five thousand eggs, the sturgeon millions. Finally, diverse tendencies are manifested as regards the care of the young, some species leaving to the mother the reproductive rôle until the very end, and others confiding it to the father. Is it maternal love or paternal love which is destined to gain the ascendency? There is also a quite curious marsupial tendency. Evolution seems undecided as to the most advantageous path to follow.

The anurous Batrachia come next, and after them the urodelous. The first deposit their eggs in the water or in the sand, where they are fecundated in an unknown manner. Incomplete coition is effected in some species, the eggs being fecundated as they are produced. A few special cases must be noted. In the South-American Surinam toad, the male places the eggs on the back of the female, where they sink in and are hatched in tiny cellules. In other anurans, the male winds chaplets of eggs around his legs, and devotes to them the proper care till birth, when the young are abandoned. In *Nototrema marsupialis*, incubation is effected in a special pouch carried on the back of the female. Evolution is again making attempts in different directions. Is it the father or the mother that is to have charge of the eggs? On quitting the oviduct, whither are the eggs to pass? Into a pouch furnished by the male, or into a pouch furnished by the female? Of brooding or sitting here, there is no question.

The Urodela enter a new phase. Here, says Espinas, "the

males fecundate the eggs in the body of the female." Of these eggs, which are laid subsequently, some care is taken by the female; but the male is ignorant of their whereabouts. This, in conjunction with certain facts presented by the anurans and fishes, has led Espinas to a theory which we shall state as follows: When the female lays her eggs, she is relieved, and abandons them without further concern. When the male afterwards approaches, and expends upon them the ardor of rut, he regards them as his own property and takes upon himself the responsibility of their charge.

In the Reptiles, all hesitation is at an end. Fecundation always takes place in the interior, previously to laying, and by copulation. The female lays fecundated eggs; conceals them more or less carefully; but as a rule shows little further concern for them. She believes her task is finished and is not prompted to continue it further. Nevertheless, some females watch their eggs a little, or even sit on them. Some, after hatching, carry their young to a place of safety, or lead them to the water, but afterwards they forsake them. In the trigonocephalous serpents of Martinique, and in the cayman alligator, the female takes care of them for a longer time. In the latter she has been seen to defend them with great fury and has exhibited symptoms of genuine maternal love. As to the male, his rôle is almost entirely limited to copulation. Some reptiles fight at the period of rut; some go in pairs. In certain crocodiles, the male and the female sit in turns. Some males even go as far as to assist the female in hatching. The most instructive case is that of the Iguana. This lizard lives during a portion of the year with the same female and will vigorously defend her against others of his species, as he would his own property. But neither takes charge of the eggs or of the young. They have the sexual passion only. With the rattlesnake it is the same. Male and female wander lovingly about together, embrace at times, but leave their eggs to hatch alone.

To sum up, in the four groups which we have examined, isolated cases exhibit different tendencies, some of which open the way to what is to become habitual in the succeeding groups. Omitting details, the following is the outcome. In the Fishes and the

anurous Batrachia, there is no maternal sentiment, but as an offset there are rudiments of a paternal sentiment, arising from the circumstance that the passion accompanying rut, not being awakened by the female, is expended entirely upon the eggs and tends to be continued in favor of the young. In the urodelan Batrachia and in the Reptiles, copulation changes the situation. The ardor of rut is mutual and engenders a pronounced bilateral sexual sentiment. This moment past, the male takes no heed of the consequences; the female, left to itself, lays the fertilised eggs and takes charge of them, but does not go much farther. The maternal sentiment begins to dawn, but the paternal sentiment is zero.

Here are presented the two branches which have sprung from the reptiles—namely, the Birds and the Mammals; and in these are accentuated and generalised the exceptional cases which have preceded, and which are most favorable for the direction which is now to follow. But before proceeding we must make a digression, in order to assign the precise meaning of the terms which we are to employ.

The phenomena of reproduction in Birds and Mammals are divisible into three acts. In the first, we have rut, copulation, and fecundation, which are consecrated by a more or less intense sexual love. The second is represented by the incubation of the eggs in the case of Birds, and by gestation in Mammals. The female is here either left to herself or lives with the male. In the last case we have the conjugal period, to which corresponds conjugal love. The third stage begins with the birth of the young and continues till the latter are able to take care of themselves. This is the family period. The family is *maternal* when the mother, left entirely to herself, alone has charge of the young; it is *paternal-maternal* when the father associates with the mother; it is *paternal*, if we may call it so, when the male, having several females, is the centre of the family. Espinas has not considered this last distinction. The care taken by the mother being a constant fact without which in the Birds and Mammals it is almost impossible to conceive the young being raised,—we shall reserve the name of family proper for the last two forms.

Family, then, for us, is constituted by the association of three elements: a male, one or several females, and one or several offspring. Its consecration is family love, which is distinguished into maternal love, paternal love, and filial love, to which must be added conjugal love—a legacy of the preceding period.

One word more. In the pages to follow we shall speak only of wild species, roaming at large. Domestication and even simple sequestration in zoölogical gardens frequently produce modifications in the phenomena of reproduction, as they also do, in even greater degree, in the social instincts.

Birds. The specialisation of the sexes has been distinctly effected here. The principal rôle falls to the male in the first period, while in the female is vested the direct responsibility in the third and the second. Let us consider them separately.

The female, in the first period, plays the passive rôle. She is coquettish, but reserved, allows herself to be seduced, abandons herself with grace, is obedient to the male, even when he is fickle, and generally remains faithful to him. Among the exceptions to the last rule are, it is said, certain doves whom the sexual sense absolutely infatuates. In the second period, the laying and even more so the brooding of eggs occupies her whole attention. She is still attached to her spouse, but on the condition that he respects her eggs. If he does not do so, she abandons him and conceals the eggs. In the third period, all is concentrated on one sentiment: care of the loved young ones. The attachment which is still reserved for the spouse is proportioned to the part which he takes in this care. If her spouse leaves her, her devotion, foresight, and ardor in defending her young increases commensurately. The hen is the model type of maternal love. The instinct of brooding is carried so far here that certain females of the eider-duck will plunder one another's nests to obtain more eggs. Her tenacity in sitting, and in covering her unfeathered young in her nest, is sometimes such that she cannot be driven away, as is the case, for example, with the kingfisher. If her eggs be broken or her young die, she will repair again to the male who has abandoned her, or to another, to be fecundated afresh. We may furtively introduce

strange eggs into her nest, and she will care for the young with the same solicitude. She will adopt the orphans of another mother. In a word, the maternal instinct is consolidated in her in its last degree of efficiency, and is one of the marvels of adaptation to ends. Enfeebled forms of these qualities are met with in only a few cases, as for example in the ostrich, the cuckoo, the molothrus, the ringdove, the tetragalle of Australia, and, according to Van Beneden, in the phalarope.

The male, in the first period, on the contrary, plays an active rôle. He chooses his female, fascinates her by his song and by demonstrations of all sorts, gives combat to his rivals, at times in real Homeric style, then copulates upon the spot, or, more frequently, leads her victoriously off. In the subsequent periods, his rôle being optional, his conduct varies. At times he remains with the female and sympathetically shares her labors; at others he basely abandons her in a spirit of contemptible egotism.

Let us follow the first case. During the conjugal period he assists the female in the construction of the nest or does it alone, fetches food, entertains her by his songs, takes turns with her in sitting or even sits alone (Rhea, Phalarope), and shares both her joys and her sorrows. Audubon recounts that *Muscicapa fulva* exhibits great agitation while its female is laying, that it encourages her, and when the operation is finished soars off in her company with great joy. During the family period, the picture is a charming one. Male and female are intimately united in the same sentiment; they vie with each other in their efforts to cause the young to swallow the food which each has furnished; they teach them to fly and to hunt.

In the second case, of the female's abandonment, three degrees are presented. In the first the abandonment is complete and immediate, directly after the male has satisfied his sexual desire or has become exhausted. Examples are the turkey, the pheasant, the prairie-chicken, and in fact the majority of the Gallinaceæ and some stilt-birds and palmipeds. Let us take the turkey. The two sexes habitually live apart. In the spring the female approaches and calls. The male hastens by, abandons himself to all the affecta-

tions accompanying rut, and copulation begins. As soon as the female begins to lay, her sexual desire is extinguished; she gradually withdraws; the male seeks her, exhibits dissatisfaction, is jealous of the eggs, which he seeks to devour and which the female defends. He finally seeks solace in renunciation, retires for a while to recoup his strength, and at last returns to his friends without exhibiting further concern for the female or her young, or rather for his females, as he is polygamous in rut. In the second degree the male prolongs slightly his stay, withdraws from time to time, returns at night, waits until the female has finished laying, and then quits her definitively. Such is the case of the eider-duck and the quail. In the third degree he abandons the female sooner or later, but returns to her when the young are born and have progressed slightly, and then takes upon himself the direction of the family. Examples are the hazel-grouse, the wood-cock, wild duck, and great bustard. I should add that among those of the first degree there are some who return to their female when the young are emancipated and voluntarily remain in her company until the succeeding rut, when the various stages are repeated.

In fact, correct unions—conjugal in the second period and familiary in the third—are the rule among birds. There are divers types. The type Raptores forms intimate unions, but is profoundly egotistical from wildness. Its couples are monogamous, live apart with their young, and savagely repel all attacks on their nests. Again there is the type of several stilt-birds and of palmipeds like the swan; in the latter the family-circle is rigorously closed; all are closely attached to one another; this again is egoism, but it is from excessive mutual love. Further, there is the type of monogamous pigeons, of which the second and third periods are merely a continuation of the sexual period which is always intense. The care here taken of the young seems accessory, a sort of playfulness, and a constant occasion of sexual love; at times in certain of these species the young are greatly neglected. Then there is the type Rhea, the American ostrich, polygamous from rut until the rearing of the young is completed. The last and most widely spread type is met with in the Passeres, Corvidæ, Hirundinidæ, the majority of stilt-

birds and palmipeds, and in some sea-birds. Its most complete expression is found among the parrots. Sexual love, conjugal love, and family love are here blended into a whole and leave hardly anything to be desired.

A few particular cases do not fall under the two preceding categories—namely, the purely maternal family and the paternal-maternal family. One case is that of the tetragalle of Australia in which the eggs are left to themselves and hatch alone. Another is that of Rhea in which the male broods by itself all the eggs laid by its females. That of the ordinary ostrich approaches to this type and deserves a few words in detail. It is polygamous; the females lay their eggs in the sand and conceal them on retiring. During the day when the rays of the sun are strong, they sit on their eggs alternately with the male but irregularly; during the night the latter alone sits. When the young are hatched, all join in taking care of them, but the father, we are assured, exhibits the greatest solicitude. The strangest case is that of a certain number of birds who occasionally or constantly lay eggs in the nests of other species and thus shirk the cares of maternity. Examples are the honey-guide or indicator-bird, the cow-troopial or molothrus, and the cuckoo. We have seen many unnatural males among birds, but unnatural females of the stripe of tetragalle and molothrus are rare. The female of the latter indulges in the most shamefaced polyandry, contracts conjugal unions of no sort, and when moved to lay seeks out in the thicket the nest of some other bird where it deposits its eggs and never again thinks of them. The cuckoo is better off; he has a female and lives with her. The latter lays her eggs in the nests of different other birds but returns from time to time to see whether their foster mother has taken care of them. When the young are able to fly she comes to them with her spouse, calls them, and thereafter both take charge of their education.

The Birds are monogamous or polygamous in the period of rut, but the males who live with their females during the second and third periods are all monogamous. The exceptions are so rare that they hardly count for anything. There are from one to three broods a year; the same couple, as a rule, remain together during the whole

term. Almost always this couple separates when the bringing up of the last brood has been completed. But sometimes they continue their conjugal union until the succeeding rut; frequently this union lasts for years if not indefinitely. Examples of this type are the eagle, *Picus principalis*, and the stork.

The purely maternal or the paternal-maternal family in some exceptional cases breaks up before the young are able to venture from their nests, as is the case with the albatross. Usually it is prolonged until the young are able to take care of themselves, or even until their education is finished, if the return of the sexual desire permits of it. In the species having two or three broods a season, its return in most cases virtually puts a premature end to the family, the double maternal and paternal instinct disappears, the married couple again becoming lovers expel willy-nilly the young from the nest. Two broods, however, may succeed each other in exceptional cases and live on good terms. In the water-hen the young of the second brood fraternise with those of the first and assist their mother.

The young have no desire at first but to get out of the nest and then to prolong their excursions. They make the attempt, fly away, return at night, and end by never coming back at all. They then generally wander about with their brothers, the time varying with the habits of the species, but in all cases they emancipate themselves on the appearance of the sexual desire. From that time on all is ended. Parents and children recognise one another no longer. There is no reminiscence of family sentiment discoverable in them.

To recapitulate, evolution tends towards the most favorable conditions for attaining the ends of reproduction, outlined in the fishes and reptiles and reaching in the majority of birds approximate perfection. It is no longer the isolated male or the isolated female who has charge of the development of the young, either within or without the egg. A contract of union is established between the two agents of reproduction, an association has been effected, a more or less powerful sentiment unites the male to the

female and to their young. The two concur in the work, each according to its organisation.

In both, the initial period is what one would imagine it ought to be physiologically. The ardor of rut is sufficient and moderate in the female, who is passive. It is violent and capable of overturning all obstacles in the male, who is active. In the later periods the mother has the entire direct responsibility, she is equal to her task, and fulfils it with a tenacity and continuity which is marvellous. The instinct corresponding to the two periods is in her as firmly established and consolidated as is necessary. In the same periods a goodly number of males have taken no step forward, have acquired nothing which is useful to the species; but in the grand majority an instinct at once conjugal and familiary is established which leaves little to be desired. On one hand and on the other it is the triumphing of adaptation of means to ends.

There are still, however, a few discouraging features. One is the rapidity with which the sexual needs put an end to the family life, the drawbacks of which affect the second part of the rearing of the young, namely, their education. The cause at fault here is plainly the plurality of broods. For progress to ensue, it is necessary that these should be reduced to one per year. The second point is the mutual forgetfulness of parents and offspring for one another after separation, and particularly when the latter have attained puberty. But the end has been accomplished, some will say; the species has been renewed, the parents have fulfilled their task.

Mammals. The exterior phases of reproduction differ here slightly from those observed in birds. The second period is frequently long, brooding being replaced by gestation. The third period may be divided into three: nursing which concerns the mother only, the interval between this period and that in which the young have become entirely emancipated, which is short, and the time which subsequently elapses before puberty, during which the young are either free or still follow from habit the footsteps of the mother.

Mammals from the point of view of family or of society, as we

shall see later on, may apparently be divided into three groups: first, the lower mammals comprising the Monotremata, the Edentata or Insectivora, and the Marsupialia; secondly, the higher mammals comprising the Ungulata, the Carnivora, and the Monkeys, men forming a class apart; and lastly, the intermediary mammals.

The Monotremata, the Edentata, and the Insectivora are the lowest with regard to family. The armadillo meets a female, copulates and goes his way. The Sorex is little better; the male and female, when not in the period of rut, devour each other whenever they can. Nevertheless, some couples keep together until the period of the young, namely, in the Onithorynchus, the great ant-eater, the hedge-hog, and the mole.

In the marsupials the instinct of maternal love is naturally quite pronounced. Gestation lasts with them about a month, but for a space of six to eight months the young occupy an abdominal pouch where they are entirely in the hands of the mother. In the wombat, however, she ceases to interest herself in them after they have quitted the pouch, but in others she continues to bestow upon them the most assiduous care. The opossum is a model of maternal love. *Phalangista* and *Phascolarctos* carry their young on their back, clinging to their long tails. As to the male, he is indifferent after rut. In the kangaroo the male has been observed to approach and to contemplate with curiosity the young who show their heads from the pouch. In the flying squirrel he assists in forming little families.

The Chiroptera, allies of the Insectivora, are no better with regard to family. Bats copulate and do not seek each other again until the succeeding rut. The mother has sole charge of the little ones, exhibits affection for them, and carries them around clinging to her body. The reappearance of the sexual desire alone puts an end to her maternal love. The Rodentia offer various types, but as a rule these are little favorable to family life and even to the development of maternal functions. The first type is that of the hamster (*Cricetus*). The male repairs to the abode of the female, copulates, lives with her for some time on good terms, and finally

leaves her. The female, five weeks after, bears five or six young, which she fosters for some fifteen days and finally drives away when they are able to take care of themselves. The dormouse (*Myosus*), *Eliomys*, the porcupine, rats and mice, the vole (*Arvicola*) and the lemming (*Myodes*) belong to the same class. With the meadow-mouse or vole, the solicitude of the mother turns to indifference as the young grow able to take care of themselves. A second type is that of the hare; he never abandons his female for the reason that he is always in rut, as is also she, even during gestation. But more scandalous is its behaviour towards its children. There is not a trace of maternal love in the female; she carries her young thirty days, casts her litter of two to five upon the bare ground, cares for them at most but a few days and abandons them, only returning to them when her milk burdens her. A third type is that of the beaver. It presents phenomena similar to those which we have met with in some birds. The male abandons the female after rut, and does not return to her till several months after, when their two to four young have grown large enough to move about (Audubon and Bachman). A fourth type is that of certain squirrels, the male and female of which keep house until their young are able to look out for themselves; these are monogamous. The fifth is that of the rabbit. Each monogamous couple has its burrow into which it suffers no stranger to pass; they never leave each other; the male loves his young as much as he does his female, he carries them, polishes their skin, and teaches them to seek their food. The mother digs a burrow expressly for them.

One of the peculiarities of certain Rodentia is their prodigious fecundity. The number of their young is generally from three to five, sometimes one, and amounting often to as many as ten. The real cause of their fecundity is the frequency of their litters, which is noticeable, for instance, in mice and rats, and which occurs almost every month in certain voles, and seven times or more a year with the rabbit. They are all voluntarily polygamous and polyandrous, copulate a few days after parturition as is the case of the vole, if not immediately, as is the case of the mouse. Furthermore, the young are very soon capable of reproduction: the time being from one

and one-half to two months in the vole or field-mouse. It has been calculated that one couple of the latter can give birth to five hundred individuals in a single year, and a couple of rabbits to the incredible number of one million in four years. The gigantic emigrations of the lemming from Norway and the pest which the invasion of our domestic rabbit visited upon Australia and California are proofs of this.

In marine mammals, the male rarely abandons the female after rut. Still, we meet with troops of old "solitary" males as they are called who have abandoned their progeny before the proper time, as we do also with special troops of adolescent young. Some are monogamous like the walrus and probably the dugong or halicore; the others are polygamous. In the latter, the father, the mothers, and the offspring remain together until the offspring are brought up, and in some, as it seems to me, even after the succeeding rut. The maternal and paternal sentiments in these polygamous families are not highly developed, the male occupying the position of a sultan of a harem who distributes his favors among many. These polygamous, or paternal families, having some social characters, we will consider more in detail in the chapter on "Animal Societies."

While on the subject of aquatic mammals I may mention the sea-otter (*Enhydris*) which is a transitional carnivore. The family intimately united and monogamous. It is composed of the father, the mother, the suckling infants, and the infants of the year preceding. The male caresses the female with his forepaws and plays with the infants. If their infants are taken away from them they weep and groan as do the seals. The mother carries her young in her mouth like the carnivora.

The Ungulata are not very fecund; as a rule they have but one offspring each year. The *Bos frontalis* has but one every two years, and the Aurochs one every three years. The musimon or wild sheep, the Capreolus or roe-buck, have two or three young, the pig three to nine. Some are plainly monogamous, like the reindeer, the gazelle, and according to Audubon and Bachman the buffalo; others are polygamous, particularly during rut, like the Alpine ibex

and the musimon; others are polygamous to the very end, like the Solidungula and the elephant. The female has the direct charge of the young. When the male abandons her after rut, she frequently forms with other pregnant females a special group. When the moment for casting has arrived she modestly retires aside. Her little one follows her everywhere, she suckles it, leads it to pasture, shows the liveliest affection for it, and defends it with courage. When her spouse shares with her the care of her young she is extremely grateful for it, loves him, and proves her affection for him in a touching manner. In the Capreolus where the union is of a charming character from rut until the termination of the bringing up, the only interruption happens when the female retires for parturition. A few days after, she is seen to return happy and exultant, followed by her little one; she calls her spouse, who hurries near, abandons himself to joy, caresses his child and its mother and resumes the direction of the family.

But this spectacle is rare. Among the Ruminants the male is most frequently impelled by the sexual instinct alone or by this and the not less striking necessity of commanding, of being master. Conjugal love after rut and family love are luxuries with them. In the Solidungula, and I shall cite particularly the wild ass (*Asinus hemionus*), as soon as the male is capable of reproduction he has but one ambition, that of imitating his father, of gathering round him as many females as possible, and of making himself the head of a troop from which he jealously drives away all young males who are approaching puberty. In the Cervidæ, at times the male lives with the female only during rut, at times he prolongs his amours until the approach of parturition, and again he often remains with her until he has performed all his duties. Thus it is with the reindeer and with Capreolus. In the Capridæ and Ovidæ, the ardor of rut controls the situation and the polygamy is entirely sexual. In the antelopes, the gazelle is monogamous and assisted throughout by the male; the capricorn is polygamous; the chamois tarries with the female only during the time of rut, afterwards resuming his solitary life. In the Bovidæ the male prolongs slightly his stay with the female but afterwards departs to associate entirely with his com-

panions, whilst the female and her young join the other females in the general herd.

Among the Pachyderms two examples will suffice. The wild boar or *Sus scrofa* lives with its females during the autumn rut, which lasts for some weeks or for two or three months, resuming afterwards its solitary habits. The female carries its young four and a half months about, and has a litter of from three to nine; she suckles them four and a half months and protects them for some time thereafter. Several litters will follow her at the same time and thus form a little society entirely maternal in character. The elephant is polygamous. He has on an average eight females, but there are reasons for believing that he is attached to one by a sort of preference for a certain period of time. The female is in gestation twenty-two and a half months, has but one offspring, and takes extraordinary care of it. The father is also attached to his offspring, but apparently after the manner of a chief of a polygamous band rather than as a father, which is the rule among the Ungulata.

The Carnivora are less fecund than the Rodentia, but more so than the Ungulata. They are monogamous in the sense that during the period of rut they associate with but one female, and that in the minority of cases where the union persists until the family phase, they have *a fortiori* but one. The mother is often excellent and devoted to her young, but sometimes leaves much to be desired. The wildcat, the puma, and the hyena, for example, quickly abandon their young in the presence of danger or upon the approach of man. The female ordinarily chooses among the males competing for her favor. The male generally abandons the female after rut or continues to live with her for a short time. In the latter case he hunts with her, or they hunt separately, each for itself, like selfish egoists. Some, like the tiger, occasionally run to the assistance of the female when she is defending her young. Among the few cases where family love exists must be classed the lion, the cat, the dingo, the fox, the wolf, and the ichneumon of the Nile. The wolf, however, voluntarily devours his offspring or abandons them in the event of the mother's death. The lion, who is extremely attached to the lioness during the sexual period and the

simple conjugal period, is indifferent to his offspring when they are born. After a little, however, his heart is touched by their mewings, their gambols and caresses, and he becomes a model father. The harmony between the three constituent elements of the family is perfect.

The Monkeys, from whom we here exclude the anthropoids, are the highest of all the mammals in point of family. They are salacious and fickle in the period of rut, but in the end they make good husbands and good fathers. They never abandon their females after rut or before the birth of the young. They are polygamous like the Ungulata and the marine mammals, but despite their polygamy there is no trace, or at least there is but little trace of a need to pose as the head of a troop of females and offspring. Affection plays the highest rôle here. One only of the monkeys is monogamous, the Nyctipithecus and perhaps the Maki. The monkeys have but one offspring, or, by way of exception, twins.

Their maternal love is admirable. Personal witnesses have described traits which are profoundly touching,—of a mother in her last breath thinking of nothing but bringing her infant to a place of safety, imploring the mercy of the hunter with an expression perfectly human, or dying from grief at her loss. The female suckles her infant, carries it in her arms, upon her back, or wound round her body. It prepares its food, caresses and plays with it, gently corrects it, and shows much foresight for its welfare. Paternal love is not less developed. The two parents vie with each other in their attention to their little one, teach it to walk, climb, and to find its food. The father will run to the aid of his offspring in critical moments, and will extricate it from perilous positions. A male arctopithecus has been observed to take his infant from the arm of its mother and to carry it himself for a while. It is not known at what period the young are emancipated, but it is certain that parental affection and care are not limited to the first year, or, in other words, that the family is composed of infants of various ages.

In the Anthropoids the conjugal and family sentiments are the same. All interest centres in ascertaining whether they also are

polygamous or monogamous, and what is the duration of their union.

I can give no opinion regarding the Gibbon (*Hylobates*). Duvancel's account of having seen mothers go to the river bank to wash the faces of their infants in spite of the latters' resistance, proves that maternity here comprehends its rôle. The orang-outang (Simia) affords a peculiarity which is frequent in mammals and which we shall speak of later,—namely, a family disposition different in the adult and in aged males. The old males are reported to abandon their females after rut. The adults, on the contrary, live with her and prolong their union for an unknown time. The family of the orang-outang is composed as follows: of a male, a female, and several young of widely varying ages amounting sometimes, as it has seemed to me, to as many as four litters. The Anthropoids, as we know, have but one offspring. As to the care devoted to this offspring the details are lacking. But when we see in our menageries the passion which the orang-outang has for infants of all kinds, and even for dolls, the delicacy with which they lift them into their arms and caress them, there can be little doubt that they are the same in the savage state. When the time for accouchement comes, the female withdraws. On the gorilla I possess unpublished data, in addition to those already known. The cases reported by negroes of gorillas having been seen with several females do not convince me. For me he is monogamous; he retains the same female in all likelihood indefinitely. He has been seen with one, two, and as many as three offspring at least, of different ages, whom he watches and defends. The chimpanzee is also most likely monogamous. In the case of Savage the family comprised a male, a female, and two infants of different ages. The following passage from Livingstone leaves no doubt concerning one of the species, the Soko: "He lives in society: some ten males together, each having its female. . . . If one seeks to possess himself of the female of another, he is knocked down and beaten by all the other males. . . . When a difficult spot has to be crossed, the father takes the infant in his arms, carries it over, and hands it to its mother."

To sum up, the Mammals, taken as a whole, are disappointing. They offer but rarely that almost ideal spectacle which so often captivates us in birds. Among the lower mammals maternal love has made a great step in advance of the reptiles, the maternal family having been constituted. But the male has remained at the same point; he abandons the female after rut. In the Rodentia progress is restricted to a few who experience the joys of paternal-maternal family life.

Among the Carnivora and Ungulata, to which we must add the marine mammals, matters tend in two opposite directions. In the Carnivora the paternal-maternal family exists; the father takes his share in the care of the young; the sentiment which binds him to his consort has not the purity which is offered us in birds, but is sufficient and accomplishes its end. The lion is the most advanced example of this type, father, mother, and offspring having for one another the tenderest affection.

In the Ungulata and marine mammals the family is paternal-maternal, but with an entirely different character; what was the rare exception has become the rule. Some are polygamous during rut only, as are many birds; but the majority are polygamous during the two other periods. In the last case, however, the spring of action is falsified. It is not a transformation of sexual love into conjugal love and alternately into paternal love which moves the father, but vanity, the desire of being surrounded by underlings, of possessing a troop over which he can exercise unrestricted authority. The number of females, which is at times excessive, and of the young which result from his many unions, proportionately weaken his altruistic tendencies. Some lose here the notion of personal responsibilty and suffer it to be merged in a collective responsibility of the herd. In short, among the Ungulata, the female is what we have seen her to be among the birds, submissive in the first period, an excellent mother, devoted, and courageous in the third, her ardor to fulfil her tasks growing with the more or less complete abandonment of her male. The male on his part experiences the same agitation in rut, offers the same combats to his rivals, but subsequently deports himself differently. At times he deserts his

females with indifference, at times he keeps them by him to lord it over them, at times he restricts his activity to protecting them from afar as an integral member of the herd, and again and by way of exception he still associates with his family, as is the case with the monogamous reindeer and the almost monogamous Capreolus.

The Monkeys seem to be descended from the Ungulata with regard to family, but they have a less marked sentiment of domination, and on the other hand exhibit a decidedly pronounced conjugal and family sentiment. They never abandon their females; they are all good husbands and fathers. The anthropoids differ from these only in the respect that they are monogamous.

It is on the female, in fine, that adaptation has concentrated all its efforts. The maternal family is a necessity, the paternal-maternal family a luxury. Outside of the hours which he devotes to reproduction, the male has always time for living and enjoying his individual life. As to the female, she has among the birds no leisure except in winter, and none at all among the majority of the higher mammals where rut, gestation, and bringing up succeed one another rapidly and without interruption. From the moment she is capable of reproduction the object of her life is one thing—love. She seeks to please her nearest spouse, she loves him and admires him. She loves the eggs on which she broods and the offspring which are born of them; she loves him who has made her a mother and who shares with her her affection for her offspring. What a difference between her and the male, particularly among the mammals! From the beginning it is pleasure which he seeks, frequently without any ulterior motive; later it is satisfaction of his activity, the need of possessing and of dominating. The male is the egoistic element in the association, the female is the altruistic element. If to employ a word which has been much abused, the male is superior to the female in all that touches the functions of outward life, the female is superior to him in all that concerns reproduction. United they form a complete whole—the physiological unit. All this is realised in the monogamous form of the family.

The polygamous form is a contrary deviation of the physiological law. If we regard the male simply as a fecundator, whilst the

female is conceived merely as a layer or bearer, it is admissible that the male should wander from female to female and fecundate as many as possible. But physiology is not of this mind. It shows that it is less important to procreate enormous quantities of young, who will necessarily be exposed to wholesale destruction from lack of care, than to assure the existence and prosperity of a small number. It shows that in the struggle against the causes of mortality the advantage is with those who with the assistance of two parents only, have exhibited the greatest powers of resistance. According as we rise in the scale of vertebrates the fecundity diminishes; the number of eggs or of young which was so large among the fishes is diminished among the reptiles, the birds, and the mammals. But the common care devoted to the progeny is also proportionately augmented. There is no doubt, even leaving man aside, that the male is devoted to his female and to his young in the inverse ratio of their number. To reduce the male to a simple fecundator, a sultan of a harem, a chief of a herd, is to misrepresent the requirements of bringing up and of education. Polygamy runs counter to the end to be obtained. Equality of number between the sexes in the various species is proof that the unions should be made by pairs and not by pluralities.

A physiological difference will explain perhaps this resistance of the mammalian male to the development of the conjugal and family sentiments as compared with birds. In the latter the total time required for hatching is short; the interval which elapses between the termination of rut and the birth of the young is not long enough for the male to contract new habits with his comrades; the love which he cherished for the female continues during brooding and is readily transferred from her to the infants. In the higher mammals, on the other hand, the time between rut and the end of the bringing up is long; the period of gestation, which varies from several months to twenty-two in the elephant, gives rise to a long gap between the love of rut and the birth of the offspring. During this time the male grows unaccustomed to the female and seeks out his old friends. It is true that there is but one litter a year, and that the return of rut, having no relation to the natural termination

of the bringing up of the young, does not put an unseasonable end to the family as is the case with birds.

We have mentioned a dark point in the case of birds—the extremely rapid separation of the offspring and the parents and their subsequent mutual forgetfulness for one another. Is it the same with the mammals? We have cited among birds the case of the water-hen, where two broods of one season fraternise with one another, with the result that the mother is at the head of a considerable flock. The mammals frequently present analogous cases. In the Virginia opossum, says Audubon, there are three litters and more a year. The young of one may still be seen in the abdominal pouch, whilst those of the two others are found running about under the watchful eye of the mother. In the squirrel, the three to seven young of the two annual litters form a troop of from twelve to fifteen following their mother. In Enhydris the family goes about, formed of a father, a mother, and of the suckling young and the semi-adults. In the wild boar the mother moves about with the young of different years. In the orang-outang and the gorilla the mother and father have been met accompanied by young of widely different ages. There is no doubt that in mammals the family shows more tendency to be prolonged than among birds. In the case of the marmot the young pass the whole winter in the same burrow with their parents. Take also the case of the roe-buck (*Capreolus*). Rut takes place in April or in May, gestation lasts from eight to nine months, and the suckling young are three months old when the second rut takes place. These still remain six months with their mother and do not leave her until the birth of another offspring. In the roe-buck, says M. Trouessart, brothers and sisters have been seen to copulate and to remain together throughout their whole life. There are reasons drawn from the social state, to be learned later on, which lead us to believe that between the moment when the young are emancipated, particularly from their mother, and that at which they reach puberty, the bond is less broken than among birds. But what is certain is that in both the first rut breaks definitely this bond, and that among mammals as among birds no

trace of affection survives between parents and young. They no longer recognise one another.

Conclusions. The family, in the vertebrates, is nothing but one of the phases of the reproduction of the species—its outward terminal phase. It solves for animals the problem of the development of individuals during the interval which separates the rupture of the egg from the moment where, being able to take care of themselves, they have only to reach puberty.

Bi-sexual generation, outlined in the highest protozoans, has been pronounced by the accidents of evolution to be the form most favorable to the reproduction of constituted types, that is to say, of species. Instead of leaving the sexes united in one and the same solidarised colonial individual, adaptation obeying the law of specialisation of functions has separated them and lodged them in different individuals. A difficult situation resulted,—that of two individuals having the same rights to the proprietorship of the resultant offspring, and the same physiological obligation of caring for their development. In some invertebrates the question is simplified: the male dies when he has fulfilled his indispensable rôle. In this uncertain epoch in the history of successive creations, where the fishes and the reptiles are born and differentiated, there are traces of hesitation. The hatched eggs perish for want of care in large quantities. Here was the opportunity for selection. The egg having been laid and fecundated, or fecundated and laid, who should assume charge of its outward development—the male or the female? In the birds and the mammals, the solution has been reached,—it is the female. Organic and psychical impulses have been created in her as the result of the law of utility: the best survive, the poorest perish. But seeing that the male does not disappear after having fulfilled his necessary rôle, why is not some use made of him? Analogous impulses to those formed in a female, prompting him to share with her the family burden, are then produced. But we have seen that adaptation has not attained absolutely identical results in the birds and the mammals. In the majority of the former, the male, prompted by a high sensibility, has become an excellent *pater familias.* In the majority of the latter,

adaptation has gone afield; the sensibility of the animal has labored under disadvantages; the egoistic impulse has gained the upper hand over the altruistic impulse. And this stands to reason. The female, passive by nature, has uniformly yielded to sensibility from her earliest origin in the protozoan cells; the male who has been active since the same period has been confirmed in his consciousness of will and of initiative. He has retained the active rôle in rut. He has also remained active in the majority of mammals in the sense of seeking to possess and to have around him as many females as possible. While from a different aspect of the same egoism the Carnivora have become monogamous, the majority of the Ungulata, of the marine animals, and of the monkeys have become polygamous. The goal is thus missing here towards which adaptation has so successfully proceeded in birds. The conjugal union, instead of being an altruistic association having in view reproduction, is the supremacy of the male over one or several females. The family, instead of being confined to one female and to a reasonable number of young which could be reared and protected, is a clan of which the male is the chief. Polygamy in the Ungulata is a digression of adaptation. If it still persists in the Monkeys, it is because it has not been able to regain the straight path. In the anthropoids, it is true, the scene is changed, and these animals have again become monogamous.

It remains for us to see what influence the various groups connected with the family and also the family itself have exercised on the formation of animal societies,—a study which will carry us to the last chapter of this part.

PAUL TOPINARD.

PARIS.

THE PROBLEM OF GOOD AND EVIL.

THE ERA OF SUBJECTIVISM.

BY far the most important problem for philosophical, religious, and moral consideration is the question as to the nature of evil. The intrinsic presence of suffering is the most obvious feature that determines the character of existence throughout, but gives at the same time origin to the most important blessings that make life worth living. It is pain that sets thoughts to thinking: a state of undisturbed happiness would make reflexion, inquiry, and invention redundant. It is death which begets the aspiration of preserving oneself beyond the grave. Without death there would be no religion. And it is sin that makes virtue a necessity. If there were no going astray, there would be no seeking for the right path; there would be no merit in goodness. Blame and praise would have no sense. In the absence of want, imperfection, and all kinds of ill, there would be no ideal, no progress, no evolution to higher goals.

Mythology being always a popular metaphysics, it is a matter of course that the idea of evil has been personified among all nations. There is no religion in the world but has its evil spirit who represents pain, misery, and destruction. Buddhists call the personification of evil Mâra, the tempter, the father of lust and sin, and the bringer of death. The Persians call him Angra Mainyu or Ahriman, the demon of darkness and of mischief, the Jews call him Satan the fiend, the early Christians, Devil (διάβολος), i. e., slanderer, because, as in the story of Job, he accuses man, and his accusations are false. The old Teutons and Norsemen called him Loki. The

demonologies of the Japanese and Chinese are perhaps more extensive than our own.

The evolution of the idea of evil as a personification is one of the most fascinating chapters in history and it would be humorous if most of its pages (especially those on witch prosecution) were not at the same time very sad. The pedigree of the Evil One is older than the oldest European aristocracies and royal families; it antedates the Bible and is more ancient than the pyramids. We have treated chapters of it in outline in another place[1] and shall not attempt to recapitulate them, but limit ourselves to the philosophical consideration of the idea of evil; and here we are first of all confronted with the problem of the objective existence of evil.

The question presents itself: "Is not evil the product of mere illusion? Is it not a relative term which ought to be dropped as a one-sided conception of things? Does it not exist simply because we view life from our own subjective standpoint, and must it not disappear as soon as we learn to comprehend the world in its objective reality?" The tendency to regard evil as a purely negative term is at present very prevalent, for it agrees with the spirit of the times and is one of the most popular notions of to-day.

In ancient times man was in the habit of objectifying the various aspirations and impulses of his soul. In order to understand beauty the Greek mind fashioned the ideal of Aphrodite, and the moral authority of righteousness appeared to the Jew as Javeh the Lord, the Legislator of Mount Sinai. Religious aspirations were actualised in the Church by means of ceremonials and ecclesiastical institutions.

Things changed at the opening of that era in the evolution of mankind (commonly called modern history) which was prepared through the inventions of gunpowder, the compass, and printing, and began at the end of the fifteenth century with the discovery of America, and the Reformation. The more the horizon of the known world grew, the more man began to comprehend the importance of his own subjectivity. The tendency of philosophy since Descartes

[1] See *The Open Court*, Nos. 421, 422, 424, 426–428, 430, 449, 450–453, 456–460.

and of religion since Luther, has been to concentrate everything in man's individual consciousness. That alone should have value which had become part of man's soul. Man's consciousness became his world, and thus, in religion, conscience began to be regarded as the ultimate basis of conduct. Men felt that religion should not be an external, but an internal factor. Toleration became a universal requirement, and subjectivity was made the cornerstone of public and private life. Thus the era of the Reformation showed itself as a revolutionary movement which, proclaiming the right of individualism and subjectivity, overthrew the traditional authority of an external objectivity.

The originators of this movement did not intend to discard all objective authority, but the spirit of nominalism which dominated them prevailed over their movement in its further progress. The last consequences of the principle of subjectivity which starts with the famous assumption *cogito ergo sum* were not anticipated by Descartes, for he naïvely assumes objective existence on one of the most trivial arguments. Nor would Luther with his peculiar education and stubborn narrowness which were by no means inconsistent accompaniments of his greatness, ever have endorsed later theories based upon the purely subjective aspect of conscience; but the fact remains that the last consequence of the recognition of the supremacy of the subjective principle is a denial of any objective authority in philosophy, politics, religion, and ethics, which leads in politics to anarchism, i. e., individualism pushed to its extreme; in philosophy to agnosticism, i. e., the denial of any cognisable objectivity worked out most systematically in Kant's critical idealism. In ethics it is the refusal to recognise any objective authority in morals; which leads either to Bentham's ethical egotism and hedonism or to intuitionism.

Our present civilisation is based upon the Protestant ideal of individualism, and nobody who lives and moves in our time can be blind to the enormous benefits which we derive from it. Nevertheless, we must beware of the onesidedness of subjectivism. Objectivism is not so utterly erroneous in principle as it appears from the point of view of modern subjectivism. The external methods of

the Roman Church are mistaken; the tyranny of its hierarchical system which substitutes the priest's authority and an infallible papacy for God's authority is radically wrong; and the main task of Protestantism consisted in protesting against this authority, which, in spite of its self-asserted catholicity, is based upon human authority of fallible mortals, an authority that was more frequently misused through bigotry and ignorance than from malice and selfishness.

There are Protestants who might object that Protestantism is not merely negative; it is also positive. It is not only a protest, but also an affirmation. True, indeed! But most of the Protestant affirmations are simply relics of the old Romanism which bound the consciences of man and crippled his reasoning power. The fanatics among the Protestants are by no means friends of liberty and free inquiry; and the positive power, the new factor in history that was destined to build up a new civilisation, was nothing else but science. Therefore, Protestantism is not as yet the last word spoken in the religious development of mankind. We must look to higher aims and more positive issues, and a new reformation of the Church will obtain them only on the condition of its again recognising the importance of objectivity.

Mankind will not return to the dogmatic system of hierarchical institutions, which would only bind again the consciences of men by man-made authority, but the fact must be recognised that truth is not a mere subjective conception; that truth is a statement of facts; accordingly, that it contains an objective element, and that this objective element is the essential part of recognised truth.

In the old period of objectivism, the ultimate authority rested with great men, prophets, reformers, and priests, whose spirit, after it had been adapted to the needs of the powerful, was embodied in Church institutions. The new objectivism discards all human authority; it rests ultimately upon science, which is an appeal to facts. Truth is no longer what the Church teaches, or some infallible man may deem wise to proclaim, nor is it what appears to me as true, or to you as true; but that which according to methodical critique is proved to be objectively true, so that everybody who investigates will find it so.

Objective truth, demonstrable by evidence and capable of revision, or, in a word, science, is the highest, the most reliable and the most valuable revelation of God. God reveals himself in the facts of life, among which we include our afflictions and personal experiences, God speaks in our conscience, which is, as it were, the moral instinct, the result of all our inherited and acquired experiences, and this is the reason why the voice of conscience makes itself heard in our soul with that automatic force which is characteristic of all deep-seated subconscious reactions. God also appears in our sentiments, our ideal aspirations, our devotions, our hopes and our yearnings. All these various manifestations are important and must not be lost sight of, but above them all is the objectivity of truth which speaks through science.

It is impossible for all men to be scientists, but for that reason it is not necessary to enslave their minds and hearts by blind faith. The faith of every man should be the trust in truth, not in fairy tales that must be taken for granted, but in the truth,—the truth which in its main outlines is simple enough to be comprehensible by all,—the truth that this world of ours is a cosmic harmony in which no wrong can be done without producing evil effects all around.

Faith in the objective authority of truth is the next step in the religious evolution of mankind. We stand now at the threshold of the third period which will be, to characterise it in a word, an era of scientific objectivism. The tendency of the second era was negative, revolutionising, theorising; the tendency of the third will be positive, constructive, practical.

Negativism and subjectivism appear from the standpoint of the positivism and objectivism of the first period as the work of the destroyer, of the negative spirit, the Devil. It is a reaction. This explains why Milton's Satan actually became a hero. Milton was a Protestant, a revolutionist, a subjectivist, and he unconsciously sympathises with Satan, who in the terms of a philosopher of the age declares:

> "The mind is its own place and in itself
> Can make a heaven of hell, a hell of heaven.

What matter where, if *I* be still the same
And what I should be."

The negativism of the second period is not a mistake. It was an indispensable condition of the third period; for it manufactured the tools for a higher and better positivism,—criticism. But criticism is insufficient for positive construction; we must have actual results, methodical work, and positive issues; and the prophet of the twentieth century finds it necessary again to emphasise the importance of objectivity.

IS EVIL POSITIVE?

After these preliminary remarks we shall be prepared to understand why the tendency of subjectivism led to the proposition that evil is a mere negation, but no positive factor. And looking for the most characteristic representative of this view among the ablest authors of our time, we find a statement written by the well-known author of the novel *Ground Arms!* Bertha von Suttner, one of the most prominent advocates of universal peace on earth. She knows as well as Schopenhauer that the ills of life are positive, for she describes all the horrors of war in their drastic reality. Nevertheless, Bertha von Suttner devotes in her ingenious book *The Inventory of a Soul* a whole chapter to the proposition "The Principle of Evil a Phantom."[1] She says:

"I do not believe in the phantoms of badness, misery, and death. They are mere shadows, zeros, nothingnesses. They are negations of real things, but not real things themselves . . . There is light, but there is no darkness: darkness is only the non-existence of light. There is life, death is only a local ceasing of life-phenomena . . . We grant that Ormuzd and Ahriman, God and Devil, are at least thinkable, but there are other opposites in which it is apparant that one is the non-existence of the other. For instance: noise and silence. Think of a silence so powerful as to suppress a noise . . . Darkness has no degree, while light has. There is more light or less light, but various shades of darkness can mean only little or less light. Thus, life is a magnitude, but death is a zero. Something and nothing cannot be in struggle with each other. Nothing is without arms, nothing as an independent idea is only an abortion of human weaknesses . . . two are necessary to

[1] *Inventarium einer Seele*, Chap. XV.

produce struggle. If I am in the room, I am here; if I leave it, I am no longer here. There can be no quarrel between my ego-present and ego-absent."

This is the most ingenious and completest denial of the existence of evil, and it is presented with great force. It is the expression of the negativism of philosophy from Descartes to Spencer. It seems to be consistent monism. And yet, we cannot accept it.

True enough, the idea of a personal Devil is as imaginary as a fairy, or an elf, or a hobgoblin; true also that there is no evil in itself, and no goodness in itself; the dualism of the Manichees is untenable. The evil principle cannot be conceived as an independent substance, essence, or entity. But for that reason we cannot shut our eyes to its real and positive existence. Granted that silence is the absence of noise; yet noise is not goodness, neither is silence badness. While I think or write, noise is to me an evil, while silence is bliss. Silence, where a word of cheer is expected or needed, may be a very positive evil, and a lie is not merely an absence of truth. The absence of food is a mere negation, but considered in the relation to its surroundings as an empty stomach, it is hunger; and hunger is a positive factor in this world of ours. Sickness can be considered as a mere absence of health, but sickness is caused either by a disorder in the system or the presence of injurious influences, both of which are unquestionably positive. A debt is a negative factor in the books of the debtor, but what is negative to the debtor is positive to the creditor.

If negative ideas were "mere abortions of human weakness," as Bertha von Suttner claims, how can mathematicians have any use for the minus sign? And if the idea of evil were an empty superstition, how could its influence upon mankind have been so lasting? On the one hand it is true that all existence is positive, but on the other hand we ought to know that existence in the abstract is neither good nor bad; goodness and badness depend upon the relations among the various existent things. And these relations may be good as well as evil. Some existences destroy other existences. Certain bacilli are destructive of human life, certain antidotes destroy bacilli. There are everywhere parasites living upon other lives, and what is positive or life-sustaining to the one is nega-

tive and destructive to the other, and every such negation is a reality, the effectiveness of which neutralises the action of another reality.

The idea of goodness is by no means equivalent with existence, and badness with non-existence. Existence is the reality; it is the indivisible whole, the one and all. Good and evil, however, are views taken from a certain given standpoint, and from this standpoint good and evil are features forming a contrast, but as such they are always actualities; neither the one nor the other is a mere nothing. The question is only whether *we* have a right to regard *our own* standpoint as the positive one representing that which is good, and all the powers that hinder human life as negative or evil.

The answer to this question seems to be that any and every being will naturally regard its own standpoint as the positively given fact, and every factor that destroys it as negative; his pleasure appears to him the standard of goodness.

And we grant that every being is entitled to take this standpoint, and that subjectivism naturally forms the initial stage of all ethical valuation. But we cannot rest satisfied with the principle of subjective autonomy as a solution of the problem of good and evil.

Supposing that good were indeed simply that which gives pleasure or enhances *my* life, and bad that which gives pain or threatens to destroy it, the standard of goodness and badness would be purely subjective. The famous savage-chief quoted by Tylor, and from Tylor by Spencer, would have fathomed the problem of good and evil when he declared that "bad is if anybody took away his wife, but if he took away the wife of some one else, that would be good." Good would be that which pleases *me*; and *the* good as an objective reality would not exist. There would be something good for me, for you, and for many others, but what might be good for me might be bad for you. Goodness and badness would be purely subjective qualities without any objective value.

The view which bases ethics upon a consideration of pleasure and pain and defines goodness as that which affords the greatest amount of pleasurable feelings is called hedonism. The coarsest

form of hedonism (as represented by Bentham) makes the pleasure of the individual supreme; it bases its ethics upon selfishness, and sees in altruism only refined egotism. The altruist is said to love but himself in others.

Let me add here that the intuitionalist basing ethics upon the voice of his conscience is, closely considered, also a hedonist, or at least a subjectivist, for he finds the ultimate authority of conduct in himself, viz., in the pleasure of those motor ideas of his which he calls his conscience: what he is pleased to consider as ethical, he thinks is ethical. His standard of morality is the subjectivity of his conviction which he is unable either to analyse or to trace to its origin. He differs from Bentham's hedonism of ethical egotism only in this, that the pleasure of his conscience overrules the lower pleasures of the senses.

Modern utilitarianism, as represented by Mr. Spencer, remains a purely subjective ethics, for it makes the greatest happiness of the greatest number, the maxim of ethics; and by doing so it introduces no objective principle, but it simply proposes to replace every single subjectivity by the sum total of all subjectivities; and subjective ethical maxims are not as yet truly ethical; they remain on the level of the world-conception of Tylor's savage.

All subjective ethical theories fail to see the cardinal point of ethics, for the very nature of ethics is objective. If there is no objective authority of moral conduct, we had better openly declare that ethics is an illusion and what we call ethics is simply an arithmetical calculation in which pleasures and pains are weighed against one another and morality is at best only a dietetics of the soul. As a matter of fact, however, he who opens his eyes will see that there is an objective authority of conduct in life. Life and the factors in life are not purely what we make them. Here we are to run a race and the course of the individual as much as that of mankind and all living beings is prescribed in a very definite and unmistakable way on the lines of what since Darwin we have accustomed ourselves to call evolution. We must learn to recognise the necessity of progress which leads us onward on a straight and narrow path. Those who willingly obey the laws of progress advance on the path in

spite of its thorns, joyously and gladly. The reluctant are urged forward and feel the smart of nature's whip, while he who obstinately refuses to mind the laws of the cosmic order goes to the wall.

Nature has no consideration for our sentiments, be they pleasures or pains. Happy is he who delights in acting according to her laws. But he who seeks other pleasures is doomed. Look at the situation from whatever standpoint you may, the criterion of right or wrong, of good or bad, of true and false, lies not in the greater or lesser amount of pleasure and pain, but in the agreement of our actions with the cosmic order, and morality is that which is in concord with the law of evolution. Ethics teaches us to do voluntarily what after all we must do whether or not it may please us.

In a word, ethics is unthinkable without duty, and the essential element of duty is its objective reality, its inflexible sternness, and its austere authority.

We say to the hedonist, a good action is not moral because it gives pleasure, but because it accords with duty; and we must not look out for that which gives us pleasure but we must endeavor to find our highest pleasure in doing that which the cosmic law (or, religiously speaking, God) demands of us.

Those who deny that there is any objective norm of right and wrong in the universe, are inclined to claim with Huxley, that man survived not on account of his morality, but on the contrary, on account of his immorality. It has been said that man is more rapacious, more egotistical, more immoral than brutes. Without denying that an immoral man may sometimes appear more brutish than a brute, we cannot see that man is as immoral as or even more immoral than brutes. But the case is worth considering.

Says the wolf in Æsop's fable: "Why is it right for you to eat the lamb, when for me it is supposed to be wrong?" Is not man in the same predicament as the wolf, and does not mankind slaughter more animals than all the wolves in the world ever ate?

Granted that the wolf's pleadings are substantiated, we observe that man lives, but wolves are exterminated, which seems good evidence in favor of man being in greater accord with the cosmic laws. And yet the actions of both, the wolf and the man, seem to

be identical; or rather, if the blackness of a crime depended upon quantitative measurement by addition, we should have to decide in favor of the wolves; for man at the present time kills more sheep, pigs, and other animals in one year than wolves could devour in a century. What is the justification of slaughter in the one case, and what its condemnation in the other?

In answering this question we shall not idealise man's mode of living on the meat of his fellow creatures. For it appears that from a moral standpoint it would be preferable to sustain life without slaughtering lambs and calves, fowl and fishes. The case must not be considered from an abstract or ideal standpoint, but simply treated as a comparison of the wolf's conduct with man's conduct; and we find that the more sheep a man eats, the more he raises. The wolf eats them without raising them. The wolf murders the lamb. However, the slaughter of the lamb by man is no murder, for it serves to increase and to sustain human souls, and the souls of man possess more truth and a higher insight into nature. The lamb dies as a sacrifice on the altar of humanity, and this sacrifice is right and good if, and in so far as, it substitutes higher life for lower life. Subjectively considered the wolf has the same right as man to kill a lamb; and also the same right as the lamb would have to kill wolves or men. The difference of man's and the wolf's actions appears only when we take into consideration the objective conditions of man's superiority, giving him a wider dominion of power which he can maintain because his soul is a better reflector of truth than are the notions of a wolf.

We must insist here that the attainment of higher life, consisting in a fuller comprehension of truth and a greater acquisition of power, is one of the most essential requisites of morality. Morality is not a negative quality, but a very positive endeavor. We must abandon the old standpoint of negativism that goodness consists in not doing certain things which are forbidden. Genuine goodness consists in daring and doing; and in doing the right thing. One genuine and positive virtue atones for many sins that consist in mere omissions. The sheep is by no means (as is frequently claimed) more moral than the wolf. The wolf is bad enough, but he is at

least courageous and keen; the sheep is a coward, and with all its cowardice it is stupid. It is time to discard the ovine ideal of morality which praises all lack of energy and of accomplishments as the highest type of goodness. What we need is a positive conception of virtue based upon a careful consideration of the requirements of life.

What higher life and lower life is cannot be declared to be an arbitrary distinction. It is not purely subjective, but can be defined according to an objective standard. Good to the savage is that which pleases him, and bad that which hurts him. Good, to him who has deciphered the religious mystery of the universe and understands the nature of God, is that which produces higher life, and bad is that which hinders, or perverts, or destroys it.

III. THE GOD-IDEA.

God is a religious term and it is often claimed that knowledge of God does not fall within the domain of science, the idea of God and all other religious terms are claimed to be extra-scientific. Thus there are two parties both of which are under the influence of nominalistic subjectivism: religious agnostics and infidel agnostics. The belief of the former is as irrational as the disbelief of the latter. If there is an objective authority of conduct, we must be able to know it; we can obey it only in so far as we know it. Now experience teaches us that there is an authority of conduct, and the theory of evolution promises to prove it by positive evidence. This authority of conduct is called in the language of religion "God." Our scientists formulate under the name "laws of nature" that which is immutable in the various phenomena, that which is universal in the variety of happenings, that which is eternal in the transient, and every law of nature is in its sphere a rigorous authority of conduct which in this sense is a part and parcel of God's being.

The most important laws of nature in the ethical domain are those which regulate all the various and sometimes very delicate relations of man to man, which intercatenate our fates and set soul to soul in a mutually helpful responsion.

Existence is one harmonious entirety; there is not a thing in

the world but is embraced in the whole as a part of the whole. The One and All is the condition of every creature's being; it is the breath of our breath, the sentiency of our feelings, the strength of our strength. Nothing exists of itself or to itself. All things are interrelated; and as all masses are held together by their gravity in a mutual attraction, so there is at the bottom of all sentiment a mysterious longing, a yearning for the fulness of the whole, a panpathy which finds a powerful utterance in the psalms of all the religions on earth. No creature is an isolated being, for the whole of existence affects the smallest of its parts; and in this sense the scriptural saying "God is Love" is a truth demonstrable by natural science.

Science proves that the whole of existence presents itself throughout as regulated by law; that it is not a chaos, not an incomprehensible riddle, but a cosmos. As a cosmos it is intelligible, and sentient creatures can learn to understand its nature and adapt themselves to it. God is that feature in the world which conditions and produces reason; and reason is nothing but a reflexion of the world-order. The cosmic order of existence, the harmony of its laws, its systematic regularity makes intelligence possible, and sentient beings will naturally develop into minds. God is that which changes individuals into persons, for reason and a rational will are the essential characteristic of personality.

Taking this ground we say (adopting here, for the sake of simplicity, the religious term God: those beings are good which are images of God.

The nature of progress is not (as Mr. Spencer has it) an increase of heterogeneity, but growth of soul. Evolution is not mere adaptation to surroundings, but a more and more perfect incarnation of truth. Adaptation to surroundings is, in an ethical point of view, an incidental blessing only of the power afforded by right conduct.[1]

All facts of experience are revelations, but those facts which

[1] Cf. *Homilies of Science*, "The Test of Progress," p. 36, and "The Ethics of Evolution," p. 41.

teach us morality (man's conduct to his fellow-beings) embody truths of special importance. They exercise a wholesome influence upon the development of our souls, even though the primitive man was not able to fully understand the why and wherefore. In the lack of a clear comprehension of facts themselves, man's imagination clothes them in the garb of mythological imagery. In our own days the great teachers of morality are still regarded as the Indian regards the medicine-man, and the sacraments of the Church are treated like the totems of savages. Religion is now slowly passing out of the old stage of magic into the higher stage of a direct comprehension of facts. Myth changes into knowledge, and the allegory of the parable begins to be understood.

As astrology changed into astronomy, so the religion of miracles will give way to the religion of science.

We often hear God spoken of as good, and he is sometimes represented as goodness in general. But God is more than goodness. God is the objective reality of existence regarded as the ultimate authority of conduct. God is thus the standard of goodness; to call God good is an anthropomorphism. His creatures are more or less good, according as they are more or less faithful portraits of him, and as they obey his will. God is neither good nor bad, neither moral nor immoral, he is unmoral; yet, his nature and character is the ultimate criterion of goodness and of morality. And God's will can be learned from his revelations, which in the terms of science are called experiences, and which we formulate with exactness in what is called "the laws of nature."

God is not existence itself; He is not, either singly or collectively, the facts of the world; He is not the sum-total of objects or existences. God is that omnipresent feature in the facts, in the objects of the world, in reality, which commands obedience; God's will appears as that something in experience to which we have to conform. In a word, God is the standard of morality and the ultimate authority of conduct. This is entheism, but not pantheism, for it recognises the distinction between God and the All or sum-total of existence. It is monotheism, but not the old monotheism, for it no longer looks upon God as one individual ego being. Yet it pre-

serves the nucleus of the oldest conception of God, and accepts at the same time all that is true in pantheism.[1]

God was always an idea of moral import. God was and will remain (so long as the word is retained) the ultimate authority of conduct. Since the order of the world in its most general features is of intrinsic necessity, which means that under no conditions could it be imagined otherwise, God is the *raison d'être* not only of the world as it actually exists but of any possible world; and in this sense entheism teaches that God is supernatural. Supernaturalism may be untenable as it was understood by dogmatists, yet there is a truth in supernaturalism which will remain true forever.

Those who see in the facts of nature only matter in motion, will naturally be surprised at the fact that a cosmos with living and morally aspiring beings can develop out of it. A deeper insight into the conditions of nature reveals to us that the world is a well regulated cosmos, having its own definite and immutable laws, and these laws are realities as much as material things. They are not concrete entities, but they are real, nevertheless, and indeed of greater importance than the existence of sense-perceptible objects. The cosmos is not only an enormous mass of innumerable atoms, and molecules, and masses of suns and stars, but its finer texture shows that down into its most delicate details it is a wonderful systematic whole, full of life and consistency, and possessing an outspoken and clearly intelligible character. The world possesses objectivity, i. e., it is a reality independent of what we think it to be. The world is not as we think it to be, but we must think the world as it is, and our duty is to act accordingly.

These are the plain facts of science which even the man who has no idea of science must mind. Only those creatures can in the long run of evolution survive who act according to the truth. Thus,

---

[1] *Entheism* is the doctrine that God is omnipresent *in* the world. *Pantheism* identifies God and the All. *Nomotheism* teaches that the laws of nature are not laws given by God as a lawgiver may issue ordinances, but that they are manifestations of God and as such parts of the Deity. *Monotheism* is the theory that there is one God, and monotheism is commonly understood to mean that this one God is a personal being.

the truth became embodied in moral rules, even before science could deduce or explain them. Religion is a revelation in so far as it is an anticipation of certain truths which were at the time of their invention still uncomprehended. Religious ideas, accordingly, had to be symbols, and could be communicated only in parables. Now, the more science progresses, the better shall we learn to understand the meaning of these parables.

God is in all things, but he is best revealed in man—especially in the morally aspiring man, and this is the meaning of the ideal of a God-man, or Christ,—a Saviour whose teachings are the way, the truth, and the life.

Jesus of Nazareth was, according to the latest and most searching historical investigations, a real historical person and not a mere myth of religious poetry, however much he was decked out with the same mythological tinsel ornaments with which all the greatest teachers of mankind, such as Zoroaster and Buddha, have been over-loaded. Yet, whether or not Jesus was a historical person is of little consequence; for the question is not whether Jesus of Nazareth lived 2,000 years ago, but whether Christ, the ideal of the God-man, the impetus of moral aspirations, is a living presence now. There are Christians whose Christianity is a mere Jesuism. Christians should distinguish between Jesus and Christ. Jesus taught the way, the truth, and the life, as he understood it; but Christ *is* the way, the truth, and the life; he is the ideal of goodness, of moral aspirations, of charity and love, as it finds its incarnation in man. He who believes in Jesus of Nazareth is not as yet free from paganism. He has the religion of the medicine-man, which is a belief in the magic power of Christian totems. He only who believes in Christ and lives like Christ has embraced Christianity,—the ideal Christianity that is free from pagan ingredients.

IV. THE EVIL ONE.

Evil personified appears at first sight repulsive. But the more we study the personality of the Devil, the more fascinating it becomes. The Evil One is in the beginning of his existence the em-

bodiment of everything unpleasant, then of everything bad, evil, and immoral. He is hatred, destruction, and annihilation incarnate, and as such he is the adversary of existence, of the Creator, of God. The Devil is the rebel of the cosmos, the independent in the empire of a tyrant, the opposition to uniformity, the dissonance in universal harmony, the exception to the rule, the particular in the universal, the unforseen chance that breaks the law; he is the individualising tendency, the craving for originality, which bodily upsets the ordinances of God that enforce a definite kind of conduct; he overturns the monotony that would permeate the cosmic spheres if every atom in unconscious righteousness and with pious obedience slavishly followed a generally prescribed course.

The ingenuous question, "Why does not God kill the Devil?" is comical enough, because we feel instinctively that it is impossible. I know of a good old woman who prayed daily in devout fervor and great piety that God might have mercy and save the Devil. Think of it closely, and this attitude is touching! How many great theologians have seriously discussed the problem whether the Devil could be saved. Like that good old woman, they were so engrossed in the literal belief of their mythology that they did not see that the problem implied a contradiction. For God and Devil are relative terms, and God would cease to be God if there were no Devil.

The universe is such that the evolution of a higher life is possible only through great strain. The evolution of the warm glow of a soul out of the cold clay of the earth, of moral aspirations out of the fierce hatred that animates the struggle for existence, of intelligence, thought and forethought out of the brute indifference of that unthinking something which *we call* matter in motion, is due to extraordinary exertions; it is the product of work performed at the expenditure of enormous energy, and constant efforts are required merely to preserve the treasures already won. Difficulties to be overcome are called in the terminology of mechanics "the power of resistance," and this power of resistance is, closely considered, an essential and even a beneficial factor in the constitution of the universe.

If there were no power of resistance, if no efforts were needed to reach any end desired, if the world were pleasure and goodness throughout, we should have no evolution, no progress, no ideals; for all spheres of existence would float in one universal ocean of bliss, and all things would be intoxicated with heavenly delight.

Pain produces the want of something better, and deficiencies arouse the desire for improvement. If the feeling substance of moners had all their wants satisfied without further exertion, man would never have risen out of the bythos of amœboid existence, and if the man of to-day lived in a Schlaraffia, he would not trouble about new inventions, progress, or any amelioration, he would simply live on in unthinking enjoyment. There would be no need of making any efforts, no need of struggling against evils, no need of virtue, no need of working out our salvation. There would be no badness, but there would be no goodness, either. All existence would be soaked with moral indifference.

Good is good only because there is evil, and God is God because there is a Devil.

As evil is not a mere negation, so the figure of Satan in religion is not an idle fancy. Goethe says:

> "Ich kann mich nicht bereden lassen,
> Macht mir den Teufel nur nicht klein:
> Ein Kerl, den alle Menschen hassen,
> Der muss was sein!"

Now, let us look at the mythical figure of Satan as represented in theology, folklore, and poetry. Is he not really a most interesting man? Indeed, in spite of being a representative of all kinds of crimes, he possesses many redeeming features so as to be great and noble. According to the account in the second chapter of Genesis, Satan is the father of science, for he induced Eve to make Adam taste of the fruit of knowledge, and the Ophites, a gnostic sect, worshipped the serpent for that reason. Satan produces the unrest in society, which, in spite of many inconveniences, makes the world move onward and forward; he is the patron of progress, investigation, and invention. Giordano Bruno, Galileo, and other men of science were regarded as his offspring and persecuted on

his account by the Church. And when we glance over the records of Devil contracts, we learn to have respect for the old gentleman. Milton's Satan is a grand character, a noble-souled rebel, who would rather undergo an eternity of torture than suffer humiliation.

Consider but the fact that, taking the statements of his adversaries alone, the Devil is the most trustworthy person in existence. He has been cheated by innumerable sinners, saints, angels, and (according to various old church legends) even by the good Lord himself; and yet he has never been found wanting in the literal and punctilious fulfilment of all his promises; and all the bad experiences he has had in the course of millenniums have not in the least lowered his character. His mere word is honored like the holiest oath, or like the best signature verified with seals and legal witnesses. The instances are rare in which it is known that persons with whom he has had business transactions have requested him to sign a contract, to give a pledge, or to show any proof that he would honestly abide by his word; his honesty was never doubted by anybody. And mind you, it is not the Devil who boasts of his integrity, but this is the conclusion at which we arrive from the evidences adduced by his enemies.

Our sympathy for this martyr of honest conduct, the dupe of God and man, grows when we consider our own nature and relation to his Satanic majesty. With our hands upon our hearts, must we not confess that every one of us, with all our likeness to God, has some trait or other that makes us kin to the Devil? I do not mean here to make reference to actual sin or grievous transgressions, but to things of which we scarcely think of repenting. Did we never in an hour of humor laugh at our neighbor? Did we never joke at the cost of somebody else? Did we never bulldoze, tease, or tantalise our very best friends? Did we never enjoy the awkward situation in which some poor innocent had been caught? And why should we not? If we took away from life its satire, jokes, and other "deviltries," it would lose part of its most fragrant zest, and if we constructed a man consisting of virtues only, would not that fellow be the most unbearable bore in the world, wearisome beyond description? For it is a sprinkling of petty vices that makes even a great

man human. A mere ethical machine would neither be attractive nor arouse our sympathies.

The Devil is the father of all misunderstood geniuses. It is he who induces us to try new paths; he begets originality of thought and deed. He tempts us to venture out boldly into unknown seas for the discovery of new ways to the wealth of distant Indias. He makes us dream of and hope for more prosperity and greater happiness. He is the spirit of discontent that embitters our hearts, but in the end often leads to a better arrangement of conditions. In truth, he is a very useful servant of the Almighty, and all the heinous features of his character disappear when we consider the fact that he is necessary in the economy of nature as a wholesome stimulant to action and as the power of resistance that evokes the noblest efforts of living beings. Indeed, the Devil is the most indispensable and faithful helpmate of God. To speak mystically, even the existence of the Devil is filled with the presence of God.

God, being the All in All, regarded as the ultimate authority of conduct, is neither evil itself nor goodness itself; but, nevertheless, he is in the good, and he is in the evil. He encompasses good and evil. God is in the growth and in the decay; he reveals himself in life, and he reveals himself in death. He will be found in the storm, he will be found in the calm. He lives in good aspirations and in the bliss resting upon moral endeavors; but he lives also in the visitations that follow evil actions. It is his voice that speaks in the guilty conscience, and he, too, is in the curse of sin, and in this sense he is present even in the evil itself. Even evil, temptation, and sin elicit the good: they teach man. And he who has eyes to see, ears to hear, and a mind to perceive, will read a lesson out of the very existence of evil, a lesson which, in spite of the terrors it inspires, is certainly not less impressive, nor less divine, than the sublimity of a holy life.

EDITOR.

LITERARY CORRESPONDENCE.

FRANCE.

THE new work which M. J. E. Alaux has just published, *Théorie de l'âme humaine, essai de psychologie métaphysique*,[1] merits our best attention, and I shall make use of this occasion to call to the notice of our readers the works of a philosopher which I regret having hitherto neglected. M. Alaux is one of the veterans of French philosophy (he was born in 1828). Openly spiritualistic he yet repudiates the dualism of Descartes and the eclecticism of Cousin. "The reducing of matter," he writes in his introduction, "to indivisible, non-extended, and active elements, to forces, and the reducing of forces to a single force, constituting a substantial foundation supporting all things: unity of type, progressive production of life from inorganic nature up to the highest stages of the scale of life and to the loftiest reaches of intelligence—this monism, this evolutionism which I have presented to the public since 1860 has nothing whatever in it of the philosophy of Cousin." M. Alaux has caught up again the threads of Leibnitz's thought. The object of philosophy, according to him, is not knowledge, but the understanding of things, and its proper task is to furnish us with new demonstrations of old and long-existing truths. Psychology, metaphysics, mind, feeling, will, human life, eternal life—such are the titles of the studies touching the human soul which make up this work.

Soul, for M. Alaux, is an activity, a higher faculty of which the particular forms are either thought, will, or feeling, and of which

---

[1] F. Alcan, publisher.

the general form is consciousness. Mind alone is known directly; states of consciousness reveal the soul. Consciousness is not, therefore, a superadded phenomenon. The soul, however, has not the consciousness of being but the consciousness of acting, and it is in its actions that it recognises its being. It is not the "thinking thing," the conscious being of the Cartesians, but the capability of conscious acts; it is conscious not of its capability but of the acts which are its realisation. Distinct from nervous action it remains as necessary as it is impalpable. The brain does not create it, but simply constitutes its medium.

One of the main aims of M. Alaux is to show that images are not the originals from whence general ideas are derived. Ideas, he says, are abstract; images, that is to say, sensations, are concrete. It is true that we grasp things by their images; but the idea bears a seal which cannot have come from sensation, and the author refuses to accept the doctrine that abstraction is contained in germ in sensation. Abstraction is in his eyes a work of the mind; if the organ *sees*, the soul *perceives*. The mind possesses, consequently, "innate ideas"; but M. Alaux makes here the following important distinction, that innate *ideas* are not innate *thoughts*, that the intelligible (idea) is not the representable (thought), and that if we think by innate ideas, we stand in need, in order to think them, of the experience which engenders them. Experience is thus the condition of the manifestation of ideas. Thought, in fine, does not shape things to fit its own moulds, as Kant would have it, nor does it shape itself to fit the moulds of things, as some empiricists maintain; but the conformity of the two is derived from a far higher source—it is pre-established. The upshot of all this is that we apprehend multiplicity by unity and finiteness by infinity, etc.; that the intelligible, which is the "necessary," gives us God, and that consequently we see God in things the same as we see the sun by its light whenever we look at illuminated objects. Lastly, the soul, according to these premises, is immortal, and M. Alaux thus builds up a doctrine of eternal life which is far removed from the rigorous Christian doctrine and which appears allied by the notion of evolution on which it rests, to Hindu thought.

Certainly M. Alaux shows with perfect distinctness the limits of science and the inextricable difficulties of empiricism; and we cannot gainsay him the necessity of a *quid primum*, of a pre-established relation between the mind of man and the rhythm of things. But we may conceive this relation in a different manner from him, and in any event it would seem to me the proper course to stop at the recognition of this fundamental fact without venturing to draw all the deductions of philosophical spiritualism. I have set forth here more than once the reasons which prevent me from accepting the doctrine that man can mentally grasp the infinite, and I can only discover a logical artifice in the species of demonstration which M. Alaux values so highly.

As to the doctrine of immortality, M. Alaux has expounded it with the same distinctness which marks his setting forth of all the varied problems of spiritualism. The popular logic, however, will still always demand how it can be that creatures capable of doing evil are yet a manifestation of God, and the pessimists will not close their eyes to the miseries which follow in the train of man's heavy ascension towards the divine. The harmony of human feeling with human reason is a problem which no religion and no system of philosophy will boast of having solved. Even the belief in the survival of the soul cannot remove it; and reason alone has no means of demonstrating to us that survival in the sense of the spiritualists.

* * *

The spiritists pretend to offer us experimental proof of it. Their number seems to be strongly on the increase and the accounts of their *séances* are very circumstantial. If we had the inclination, were it only from curiosity, to join this movement, which is to-day drawing to it so many disturbed souls and even inquiring scientists whose good intentions we cannot suspect, we should read with interest the French translation of a large work by a Russian spiritist, M. ALEXANDRE AKSAKOF, entitled *Animisme et Spiritisme*.[1]

M. Aksakof has wisely arranged his facts in distinct categories. He studies first the so-called phenomena of "materialisation," then

[1] *Librairie des Sciences psychiques.* Leymarie, publisher, 1895.

he attacks the study of the "intelligent agent," which according to his contention is manifested in the phenomena of spiritism, and lastly, he sets himself the task of developing and justifying "the hypothesis of spirits." His critical and compilatory work has been conceived as a sort of answer to the objections formulated by Eduard von Hartmann. The latter does not deny all the facts of materialisation; to explain them he admits that the nervous force of the medium is capable of producing dynamic effects and the effects observed would then be the result of that nervous force acting "at a distance." The subjective state of the participants, that is to say, hallucination, would accomplish the rest and be amply sufficient to explain the miracle.

Spiritists, as is natural, will hear nothing of hallucination. They maintain the objective reality of these phenomena, of which they claim to have demonstrative evidence by photographic records and material imprints. Although not admitting that all the effects produced are directly effected by the medium, who is simply the occasion of them, they yet believe in the real presence of spirits or phantoms.

I have had no personal experience in these matters and cannot therefore give an authoritative opinion of them. Nevertheless, the hypothesis of Von Hartmann appears to me insufficient to account for the various details of the phenomena, such as they are described; besides, it is a risky one and is apt to carry the philosopher of the "unconscious" further than he is perhaps desirous of going. However, he has sought the explanation in the place where it is likely to be found—in a more complete knowledge of the nervous system. The part played by nervous action is certainly considerable in the phenomena of spiritism, if indeed it does not constitute it all. The believers are too hasty in evoking phantoms and in casting in old moulds the facts which they furnish us. The expectant attitude is perhaps more potent here than the simple state of faith. M. Aksakof personally writes with moderation and displays a prudence which is highly commendable. His frankness in the discussion does him honor, as does also his extremely sincere conviction.

An elegant little volume by M. EDMOND THIAUDIÈRE, *La Soif du Juste*, is the sequel of a series of *Notes of a Pessimist*, published under the titles of *La proie du néant*, *La complainte de l'être*, *La Décevance du vrai*.[1] I have not yet introduced this writer to our readers, but they will readily appreciate his merits. If M. Thiaudière expresses his doctrine in a dispersive form and gives us only "thoughts," he nevertheless possesses a philosophy which will appear sufficiently coherent after an attentive reading. I shall not reproach this author for his bitter sentences, nor do I desire to reopen the eternal discussion of optimism and pessimism. Whether or not we shall contest his right of imposing upon his conception of the world a "sentimental" color, and of seeing things, so to speak, under the angle of his own subjective feeling, we shall nevertheless soon gain the impression of his perfect sincerity, of his good will, and may perhaps end by declaring that after all he is a pronounced meliorist. He dwells too extensively upon the merits of kindness and on the superiority of altruism for a person that does not expect some amelioration of the lot of man from these sources. "There is," he writes, "something divine in the world for the reason that there is something divine in man; it is this divine that should be invoked and evoked."

The possibility of God, who "would be nothing less than the impersonal bond between things," the necessity of religion and of the cultivation of ideals, evolution of the spirit away from flesh and brutal appetite towards delicacy of sentiment, the solidity of moral law and of duty,—these are the strong points in the doctrine of M. Thiaudière. The doubt which he expresses touching the concepts of God and of soul, of liberty, and of survival after death, is productive of no doubt in practical action, and his philosophy presents as a result of these features a marked note of beneficence.

"Although the cruel play of nature," he says, "tends to demonstrate that divine justice is only a sublime dream of man, it is nevertheless the best plan to count upon it." He reaches thus the following thought: "Those who do not believe in God know per-

[1] L. Westhausser, publisher.

fectly well that even if God does not exist yet things go on exactly as if he did exist, for no one can trespass with impunity upon the established order." I, too, have held that the order which reigns in the world gives us merely a sort of mechanical justice, for which it is the duty and lofty ideal of humanity to substitute a moral justice. In this point, therefore, I subscribe to the doctrine of M. Thiaudière, and I do not think we can invalidate the moral lesson which he presents to us in the following ingenious form: *"L'immoralité donne souvent de beaux acomptes, mais toujours elle se solde par un passif énorme."*

In fine, M. Thiaudière is a genuine thinker. Those who do not know him will be glad that I have called their attention to his name and writings.

* * *

The work of M. JACQUES LOURBET, *La femme devant la science contemporaine*,[1] is written with all the fervor of youth and is loaded with facts. But I fear the author has not really "seen" the problem of which he treats. He seems particularly bent on demonstrating that women are not animals, which we will grant him from the start, and he ends with claiming for them *absolute liberty*, which is a formula either terribly indefinite in extent or altogether harmless in its scope.

That women may possess genius, no one has ever doubted and numerous examples are witness of it. It is true that we do not find superior women who have been really the peers of superior men. But at bottom that is not of great importance and presents no real interest, except for psychological study. The sociological question is different. It is not requisite here to know whether a women is as competent as a man to plead before a legal tribunal, or to cut off a leg, nor even to decide whether from the point of view of mind the feminine sex is inferior to, equal to, or the equivalent of the male sex. No, the problem consists essentially in determining the social function of woman consonantly with her biological function. We may reject on this point the empirical solution of history, but we

[1] F. Alcan, publisher.

cannot neglect it. How can we possibly maintain that evolution has with regard to one of the sexes been artificial in all places and from the commencement of time? The precise task of evolution, M. Lourbet will tell us, is to lift woman out of her humble sphere, to elevate her higher, and to break the constraints which now weigh down upon her. Undoubtedly woman must benefit by the general progress of the species, and it would be unjust to say that she has not benefited thereby very extensively. But let us not forget that evolution will never end in inverting the rôles of the sexes nor make of organisms which are physiologically distinct, organisms which are the same; and this organic distinction will always have consequences which the fanatics of woman's emancipation at present misunderstand, although they certainly must have some mental reservations upon the subject.

It is difficult to predict what will happen to-morrow in society; but one can foresee at least that the laws of nature will always intervene to redress the work of human laws which do not conform to nature. In all cases the question is, I repeat, not the discussion of useless superiorities, nor the systematic exclusion of women from all rights, nor dispensing with her necessary services and duties; but it is to find out within what limits and under what conditions it is profitable for society and useful for women themselves to extend the sphere within which her actions have hitherto been confined. The solution of the problem should be sought neither in absolute principles, nor in the arguments which exceptional instances offer; it can only be proportioned to the social medium, to the race, and to all the practical conditions of the period under discussion. "The roughest blow which can be delivered to the cause of the emancipation of women in France," said Madame Clémence Royer to me one day, "would be to grant them forthwith all the rights which their imprudent advocates claim for them."

* * *

I shall mention in concluding the new edition of a work by M. Émile Boutroux, *De la contingence des lois de la nature*, a work purely dialectical in character; an *Etude sur l'espace et le temps*, by M. Georges Lechalas, in which are treated with competence the

abstract questions of geometry and mechanics, the problems of "similar worlds" and of the "reversibility of the universe," which lead the author to a criticism of the notions of infinity and continuity; a curious work by M. L. DUGAS on *Le psittacisme et la pensée symbolique*, in which the author after having presented language as a simplification or abridged notation of thought shows that parrot-like mechanicalism of speech is the rock on which language stumbles, when words have become abstract and empty of all real contents.

In the list of historical works I have still to signalise a very complete edition by M. E. DREYFUS-BRISAC of the *Contrat social of Rousseau*, and finally an extremely learned work by M. ANDRÉ LICHTENBERGER entitled *Le socialisme au XVIII siècle*, wherein we can follow with lively interest the budding and encasement, so to speak, of the ideas and systems which are so profoundly at work in our modern societies.[1]

LUCIEN ARRÉAT.

PARIS.

[1] The works last mentioned are published by Alcan. I may also note the French translation of a book by Count Leo Tolstoï entitled *Les Evangiles* (Perrin et Cie, publisher).

BOOK REVIEWS.

HERMANN VON HELMHOLTZ'S UNTERSUCHUNGEN ÜBER DIE GRUNDLAGEN DER MATHEMATIK UND MECHANIK. By *Dr. Leo Koenigsberger*, Professor of Mathematics in Heidelberg. Leipsic: B. G. Teubner. 1896. Pages, 58. Price M. 2.40.

The present pamphlet, which is the elaboration of an address delivered last year on the occasion of a memorial celebration in honor of Karl Friedrich, the rehabilitator of the University of Heidelberg, gives a rapid but lucid presentation of the scientific achievements of Helmholtz in everything relating to mathematics and mechanics. One gets from it a renewed and deepened sense of the tremendous comprehensiveness of Helmholtz's scientific activity, which in this respect has scarcely been rivalled by any inquirer of ancient or modern times, with the single exception, perhaps, of Aristotle. Many have exhibited greater acumen and genius in one or a few departments, but none have left the impress of originality and profundity on so many. Galileo, Huygens, Thomas Young, Faraday, J. R. Mayer, Lagrange, Gauss, possibly surpassed him in scope and significance of individual achievements, in classical elegance of presentation, or in philosophical grasp, but they have not rivalled his wonderful versatility which alternately resumed and elaborated nearly every province of positive, physical research. There have been some who have denied him genius of the purest and most unqualified type, but none can gainsay his having reached the pinnacle of consummate virtuosity. His name has drawn to itself and absorbed a preponderating share of the scientific achievements of the closing half of the nineteenth century, and like all overtowering personalities his fame will no doubt be handed down to posterity associated with performances in which others have taken no less distinguished and perhaps even more prominent a part. With few exceptions he is unconsciously accredited in all academical circles not only with the independent enunciation of the principle of the conservation of energy, that crowning generalisation of the science of our century, but even with its sole enunciation, and in the popular world the tendency is absolutely dominant, to accord to him the sole merit of its discovery. Impartial judges assert that Mayer, even barring the questions of independence and priority, which certainly belong to the Heilbronn physician, was, date for date, far ahead of Helm-

holtz in the philosophical appreciation of the principle. Certainly there can be no doubt of Mayer's merits and share in the original discovery. Yet Helmholtz's, not Mayer's, name will go down in popular imagination and history exclusively associated with the greatest scientific triumph of our age. Thirty years ago and more, his claims on the same head were, in an able article in the *English Cyclopedia*, entirely subordinated to those of Grove, who delivered his lecture on the "Correlation of Physical Forces" as early as 1842. Now, in the accounts of the discovery of the law, there is scarcely a mention of Grove—such is the increasing inertia of a scientific reputation. And as he overshadowed in this province Mayer, Joule, Carnot, and others, so, too, in his famous researches regarding the foundations of mathematics, in his great systematic investigations of physiological optics and acoustics, he naturally and by sheer force of his scientific ascendancy obscured or ingurgitated a goodly portion of the work of other equally meritorious inquirers.

But this is not strange. The same natural result has occurred in the case of all great historical and scientific personalities, and even of places, though in a less degree now-a-days than in the old mythical periods. It is an imperative social law. Legend and history attribute to Charlamagne all that was good and great in his time: Venice, Rome, and Troy[1] are the inheritors of all the glories and of the history of their namesakes; and so in a successively diminishing degree Pythagoras, Aristotle, Newton, Leibnitz, and Alexander von Humboldt have stood as the epitomes and incarnations of their scientific time, country, and domain. Gigantic maelstroms, they have sucked into their maws the philosophical and scientific driftwood of nearly the whole contemporary world!

One of the most embittered opponents of Helmholtz's title to genius and fame is Dr. E. Dühring, a highly independent, powerful, and versatile thinker, who many years ago conducted a battle royal with the authorities and faculty of the University of Berlin on the occasion of his being refused a chair of philosophy in that institution. In this encounter Helmholtz drew upon himself Dühring's undying wrath. Speaking of the confusion which exists in the popular mind regarding the intrinsic worth of the great scientists and thinkers of the world who by the vulgar are universally rated much lower than the fashionable authorities of the day, Dühring once cited as an instance a passage in Schlosser's *Universal History* where the well-known historian in a grandiloquent dash of rhetoric speaks of "the history of mathematics from Archimedes to Kästner!" Kästner, a professorlet in the last century at the University of Göttingen, whose main achievement was a tolerable history of mathematics, and Archimedes, the incarnation of the mathematical genius of antiquity! "Really," interpolates Dühring with fine derision, "One might as well speak of the history of physics from Galileo to *Helmholtz*!"

Contrasted with this exaggerated scorn we may place the present estimate of Dr. Koenigsberger, Professor of Mathematics in Heidelberg, which exhibits the

[1] See Carus Sterne's *Trojaburgen*. Glogau. 1893.

glorious plenitude of Helmholtz's work in but a single department. We read here of his philosophical discussions relative to the foundations of mathematics, which opposed the modern empirical view to the transcendentalism of Kant; of his physiological and psychological researches which furnished the foundations of his subsequent empirical theory of the origin of space and time; of his researches in the non-Euclidean geometry proper; of his application of the latter to colors; of his enunciation of the principle of the conservation of work; of his hydrodynamical and aerodynamical investigations; of his theory of vortices; of his researches in electricity; of his consequent examination of the fundamental principles of mechanics and the theorems resulting therefrom; and finally of his theories regarding the dynamic constitution of matter, the ether, etc. This last was the final work of his life, and we learn that the intended subject of his address at the meeting of the German physicians and inquirers in Vienna was actually "Permanent Forms of Motion and Apparent Substances." What the character of this address would have been is unknown, as only a few notes regarding it were found among Helmholtz's literary remains, but it is supposed that it would have elaborated the philosophical foundation of the extensive researches which he had been conducting in his last years regarding the basic principles of mechanics and physics and at which he had hinted in his Introduction to the *Mechanics* of Hertz. Of his achievements in this department, let us finally add, the reader will find in this pamphlet of Dr. Koenigsberger a concise and worthy account. A fine portrait of Helmholtz taken from the oil painting in the possession of Frau Ellen von Siemens, forms the frontispiece of the brochure.

THOMAS J. MCCORMACK.

DIE UEBERWINDUNG DES WISSENSCHAFTLICHEN MATERIALISMUS. By *Wilhelm Ostwald*, Professor der Chemie an der Universität Leipzig. Leipsic: Veit & Comp. 1895. Pages, 36.

This pamphlet of thirty-six pages is a lecture which Prof. Wilhelm Ostwald, one of the most prominent chemists of Germany, and Professor at the University of Leipsic, delivered on September 20, 1895, before the Association of German Naturalists and Physicians at Lübeck. It is a protest against the materialism of science, and the author is fully aware that he has taken a position at variance with the opinions of many great scientists. He has the consciousness of a lookout whose duty it is to call "breakers ahead!"

The famous *Ignorabimus* of Du Bois-Reymond is in Professor Ostwald's opinion nothing but a protest against the mechanistic world-conception which is at present dominant in scientific circles. Ostwald does not seriously believe in the *Ignorabimus*, but claims that we have not as yet fully understood the salient point of the problem, for there are processes which are not representable by mechanistic equations, and this much is certain that we must give up the hope of interpreting the world as a mere play of atoms. Professor Ostwald proposes to replace mechanism by the energetic world-conception. The result of his investigation remains

at present negative. He calls attention to the fact that the pressure of gases is equal in all directions. The factors of electric energy, potential, and electrical quantities generally, such magnitudes as may be called polar, being representable not only by numbers but also by opposite signs which, when added, reduce two equal quantities to zero, are not known in mechanics, and this Professor Ostwald declares is the reason why we are unable to find a mechanical hypothesis for electrical phenomena. By reducing the laws of nature to analogous modes of an energy, the author hopes to attain to a science that would be free from hypothesis. Professor Ostwald finds a substratum of energy redundant, and believes that energy should, with the exception of time and space, be the sole magnitude for scientific equations. He does not enter into a discussion of the details of his world-conception, but considering that energy is expressed either in motion or in the possibility of motion, his philosophy is more mechanistic than his censure of the mechanistic world-conception seems to allow.

He concludes his lecture with the question: Is energy, indispensable and useful as it is for the comprehension of nature, indeed sufficient for this purpose, or are there phenomena which cannot be formulated in the hitherto known laws of energy? This question is briefly answered in the negative, and we may expect that Professor Ostwald will present his arguments on this head in future investigations. But we wish to state at once that the conception of energy is as little all-sufficient for the interpretation and explanation of nature, as are the conceptions matter or spirit. For there are phenomena in nature which cannot be reduced to energy. We ought to remember that energy, matter, space, and spatial relations, sentiency, including all subjective phenomena of soul-life, ideas, and all representative psychical images of mental life are different fields of abstraction. None of our generalisations will be found sufficient to serve as an all-comprehensive idea under which all phenomena can be subsumed. Monism should not become a single-substance theory. The principle of genuine monism is preserved when we bear in mind that the totality of nature is one indiscerptible entirety, and that our various conceptions are aspects of different features of reality. Professor Ostwald will find it impossible to explain the nature of ideas from any kind of energy, for ideas have nothing to do with energy. What has the notion of a mathematical line or circle to do with either pressure or motion, or with any mode of motion, be it electricity, light, or what not?

Professor Ostwald's lecture has created quite a stir in the scientific world, and it appears that he has been greatly misunderstood. He has been suspected of a hankering after unscientific notions of mystic and agnostic world-conceptions, but from the trend of the lecture it seems to us quite clear that the tendency of his thought is exactly the opposite. He wants to realise the ideal of a genuine positivism in which science would be a mere description of facts free from all hypothesis. Though the lecture does not propose a definite solution of the problem, and gives only a hint which in our conception does not lead in the right direction, we have

devoted so much space to its discussion because Professor Ostwald's thoughts are suggestive and will not fail to provoke a discussion of the most important problem of science, which, in brief, is the question, "What is the philosophy of science?"

P. C.

HERMANN GRASSMANN'S GESAMMELTE MATHEMATISCHE UND PHYSIKALISCHE WERKE. I. Band. II. Theil. Die Ausdehnungslehre von 1862. Leipsic: B. G. Teubner. 1896. Pages, 511. Price, M. 16.

The task of publishing a complete edition of the mathematical and physical works of Hermann Grassmann was recently undertaken by the Royal Saxon Academy of Sciences, and the work of editing them has been entrusted to Friedrich Engel assisted by Jakob Lüroth, Eduard Study, Justus Grassmann, Hermann Grassmann, Jr., and Georg Scheffer. The first volume, which is now completed, embraces two parts: the first, the *Ausdehnungslehre* of 1844 (also containing the prize essay on geometrical analysis), has already appeared; the second, the *Ausdehnungslehre* of 1862, is that now in our hands. The relation of these two famous books will be better understood by a glance at Grassmann's life, which is interesting in more points than one, and whose contemplation is more apt to hold our attention than would be a difficult and abstract analysis of the contents of his works.

Hermann Grassmann, independent creator of a branch of mathematics which is accounted by some the most consummate piece of work in this direction that the present century has produced, was born (1809) and destined to spend his life in the German city of Stettin, commercially an important place and the central emporium of the German Baltic trade, but naturally bereft of the incentives and ideal environment which usually go to the formation of a scientific career. Grassmann, however, came of a talented family and one that remained talented. His two sons, Hermann Grassmann, now at Halle, and Justus Grassmann, at Brandenburg, have displayed unusual mathematical attainments.[1] His father also was a mathematical teacher of some note and had published a number of profound and original writings in which were contained the germs that determined the subsequent scientific bent of his son.

Hermann Grassmann first became a student of theology in Berlin and had among his teachers Neander and Schleiermacher, the latter of whom was not without influence upon his philosophical development. Now as afterwards his studies varied much, and even included the mathematical works of his father, but most of his work was done in philology. With interests comprehensive rather than vacillating we find him, shortly after taking his first theological examination, a teacher of mathematics in Berlin where he made the acquaintance of Jakob Steiner, whose epoch-making work on *Synthetic Geometry* had appeared two years previ-

[1] Note the former's *Punktrechnung und projektive Geometrie*, the second part of which, *Grundlagen der projektiven Geometrie*, appeared last Easter in the programme of the Latin *Hauptschule*, of Halle.

ously. A year or so afterwards, he returned to his native city where he was installed as teacher of various branches at the Ottoschule and where he devoted himself alternately to chemistry, crystallography, botany, mathematics, and philology. In the last branch he even published two small works, the forerunners of his later activity in this field. He had not yet given up theology, in fact he had passed at just this time his second examination for the preachership, but his previous studies for a teacher's diploma in mathematics had led his interests into different fields and these gradually and unconsciously brought with them the abandonment of his theological ambitions.

This was in 1839. In preparing for his full teachership in mathematics and physics, he read Lacroix, Lagrange, and Laplace, the study of the latter of whom suggested a treatment of the problem of the tides, taken as his thesis, in which he developed and applied new and greatly abbreviated methods of reckoning (1840). This was the germ of the new science, and it is interesting to note that it took its rise in connexion with a practical mechanical problem, as have many other branches of mathematics, and notably the Calculus of Variations.

From this time on, the fundamental ideas of the coming *Ausdehnungslehre* began to take a systematic shape in his mind. In 1842 he was called to the Gymnasium, and in the succeeding year to the Realschule. Now naturally his eye was bent upon a professorship in a university where his scientific ideas under the stimulus and correction of his colleagues, and in the clarification which results from their being communicated to others, would have a chance of unfolding and of being disseminated. But this was an ambition never to be realised.

His study of the works of Möbius and Poncelet which of any then existing had most kinship with his thought led to a paper in *Crelle's Journal* on the *Theorie der Centralen* which first displayed his wonderful powers of generalisation. In 1844 his famous *Lineale Ausdehnungslehre* appeared, which not only is the most important of his own works but is rated by competent critics as one of the most remarkable mathematical creations of all times. This is the first of the works mentioned at the beginning of this notice, and together with the prize-essay on Leibnitz's calculus of position, formed the first instalment of the present Teubner edition of his collected works.

It was an original creation; Grassmann's methods of reckoning were altogether novel; and the deduced laws had reference entirely to abstract constructions in extremely abstract domains. The terminology was strange. The argument was not developed in connexion with concrete data, not even with the data of space, although numerous geometrical and mechanical applications were appended to the theorems. Owing to its intrinsically limitless possibilities of application, the treatment of the author was significatory rather than expository. In addition, it bore a philosophical stamp which was not common then in mathematical works. A meteor in the realm of scientific thought, it seemed to break all the traditions of evolutionary growth: it had no predecessor.

As an offset to this sudden and inexplicable appearance of the new science, Grassmann wrote for his book a preface which almost attained Galilean heights in its frankness and sincerity of character, and which gave a perfect insight into the workings of his mind. His plea for indulgence in this preface is an almost pitiable expression of his scientific seclusion and isolation.

On the book's appearance, no one seemed to grasp what the author was driving at. Gauss, Grunert, and Möbius considered it, but nothing at the time came from their outward sympathy. With the exception of one unimportant reference, not a single review or mention of it appeared in other works or magazines, save Grassmann's own *Selbstanzeige*, until the early seventies. Eight years after its publication Möbius remarked that Bretschneider of Gotha was the only mathematician he knew of that he read it through.

Appreciating the difficulties that beset the comprehension of his book, Grassmann set to work to unfold the practical capabilities of his method which he did in a long series of articles in the mathematical journals of Germany, all of which were signalised by great originality and acuteness, and on which his sole fame as a mathematician until the later years of his life rested. His failure again to receive recognition, however, soon resulted in his partially abandoning these studies, and caught by the enthusiasm of the year 1848, quite contrary to his natural disposition, he became for a while actively interested in politics. Then he took up the study of comparative philology, Gothic, Lithuanian, Old Prussian, Old Persian, Russian, and other languages. He published a grammar and reading-book of German.

In 1852, on the death of his father, he succeeded the latter as the first mathematician with the title of Professor at the Gymnasium of Stettin. Were it not for this change he would probably have given up physics and mathematics forever. Here, however, falls his important correspondence with Möbius, a number of important articles in the mathematical journals, a discussion regarding the priority of his method with Cauchy, and the efforts which he made and the prospects which were held out for advancement to a university professorship. Such a position was now highly desirable in the interests of a fruitful scientific activity. Pecuniarily it would have been a retrograde step, but the work at the Gymnasium demanded too much time and effort, and was too absolutely barren of the right kind of intellectual suggestion for his thought to yield its best results. He lacked students and hearers with whom he could inoculate his ideas and who would form a nucleus for their propagation. But the chance never came, although there were frequently promises and hope.

He was now again hard at work on the second part of the *Ausdehnungslehre*. Möbius and Grunert had complained of the predominantly philosophical form in which the first *Ausdehnungslehre* had been cast, and attributed its lack of success to this circumstance, which they regarded as repellent to the mathematical mind. At their suggestion, and by an incredible outlay of labor, Grassmann remodelled the work entirely, and presumably under the influence of his own impressions of

mathematical method gained in elementary teaching, but which were at variance with the growing mathematical taste of the age, gave to it a predominantly Euclidean form.

Such was the origin of the *Ausdehnungslehre* of 1862—the work which is now before us. Two opinions obtain regarding its value in a methodological aspect as compared with the *Ausdehnungslehre* of 1844. Victor Schlegel, friend and disciple of Grassmann and a prominent elaborator of his ideas,[1] while admitting the prodigious importance of the new conceptions contained in it, is of opinion that the work suffered unspeakably by its being recast into its Procrustean Euclidean mould. It had not been inexact in its original form, nor did its foundations lack logical stability. Its drawback had been simply a want of practical illustrations. This want had, it was true, been richly supplied in the second edition, which abounded in analytical and geometrical applications, and which contained a new and extensive chapter on the theory of functions, untouched in the original work, and which was a veritable incubator of the germinal ideas at the basis of many modern branches of mathematics like the theory of determinants and certain recent extensions in algebra. The treatment, however, was fragmentary and disjointed. Its unnatural, stiff Euclidean movement obliterated the psychological landmarks which are so necessary for our guidance in re-making the intellectual conquest of a new and untrodden province. The mastery of a single demonstration, says Schlegel, required as much effort as the comprehension of a whole chapter of the *Ausdehnungslehre* of 1844. But worst of all, the possibility of a broad mental survey, of a comprehensive *aperçu* of the development as a whole had been entirely lost. These circumstances, according to Schlegel, were directly accountable for its failure, which was even more complete than that of its predecessor. Friedrich Engel, on the other hand, the editor of the edition before us, regards the *Ausdehnungslehre* of 1862 as a distinctive advance upon that of 1844—an advance exhibited not only in its greater variety and richness of contents, but in its entire formal construction. According to him, the foundations of the *Ausdehnungslehre* of 1844, although brilliant in their suggestiveness, were not unequivocally established. Its fundamental conceptions were too general and philosophical in character and consequently too devoid of palpable contents, to form a solid and trustworthy substructure for a practical working-system. Tacit assumptions were necessary for its logical application and development, all of which was remedied in the second work, and the necessity of the same demonstrated by the consequent enormous extension of the scope and utility of the new method.

But with whomsoever the truth may lie, certainly the failure of the book could not have been more absolute. The work was nowhere reviewed, nowhere mentioned. Grassmann's attempts to obtain a university position again failed. The

[1] See his pamphlet *Hermann Grassmann, sein Leben und seine Werke* (Leipsic: F. A. Brockhaus, 1878), a vivid and adequate sketch of Grassmann's life and career.

dream and ambition of his youth melted away. And now this sorrowful spectacle is presented to us. At the advanced age of fifty-three he laid aside the studies which were soon destined to make his name one of the most famous in Europe and began a fresh career with unbroken heart and undampened hope. He took up the study of Sanskrit. The vigor and unweariedness with which he devoted his energies to the new work were marvellous when we consider his age, disappointments, and the diametrically opposed character of his previous studies and habits of thought. But more marvellous was his success, which is an astonishing testimony of the versatility of his genius and talents. Here that reward, which had been denied him in his chosen and natural field of effort, crowned his endeavors. From the early sixties until shortly before his death in 1877 he worked successfully at two tremendous undertakings, a *dictionary* and a *translation* of the Rig-Veda—at a time when the material and helps for such work were extremely meagre. His first recognition in the academic world came to him as a philologist not as a mathematician. Not to mention other honors, he was elected a member of the American Oriental Society, as he also found here one of his first few individual recognitions as a mathematician.

In the meantime, however, attention had in various mathematical quarters been directed to the *Ausdehnungslehre* of 1844. Hankel, then a young Privatdocent in Leipsic, had sought to bring it to the fore. Through Clebsch he was elected a corresponding member of the Göttingen Society of Sciences. Mention of him became more and more frequent. Preyer based upon his work a new theory of sensations. Schlegel elaborated in detail some of the principles of the *Ausdehnungslehre* and now actually a demand for the book arose, the first edition of which by a horrible irony of fate was reported by the dealer to have been *exhausted*. No one could account for this silent but terrific demand for the book until it was discovered that the whole edition had been used to satiate the *Wissensdurst* of a paper-mill. Yielding to the solicitations of his friends, therefore, Grassmann set to work at the preparation of a new edition, which he completed just shortly before his death (1877). Several important mathematical and physical papers also were published in this period of his incipient fame, which now dawned with full glory upon him as his life closed.

A note of bitterness and regret pervades our contemplation of Grassmann's life, for we are constrained to wonder what would have been its fruits had he found a more fitting and congenial sphere for the exploitation of his abilities, and had his energies not been scattered over so many fields. But that note of bitterness, however justified its cause, was never marked in his own career, which was one of complaintless serenity and of unceasing devotion to duty and to science. His unselfishness was requited by the love and confidence of his students, colleagues, and townsmen, in whose social, intellectual, and artistic advancement (he was a musician of ability, too,) he took no mean share. In this modest civic sphere his talents shone with unconsciously heightened lustre.

There remain of Grassmann's works, presumably to be comprised in this series, twenty-four mathematical papers published in *Crelle's Journal*, the *Mathematische Annalen*, the *Proceedings of the Royal Society of Sciences of Göttingen*, and Grunert's *Archiv*; three separate treatises on elementary mathematics, mechanics, and the relation of the *Ausdehnungslehre* to the non-Euclidean geometry; and finally, seven papers on various branches of physics. We have merely to add that the present volume, the *Ausdehnungslehre* of 1862, is printed in unusually good form, is richly supplied with annotations by the editors, and that in all cases where changes have been made in the text, an exact transcript of the original passages is given in an Appendix. A good index also adorns the work. THOMAS J. MCCORMACK.

TRACTATUS DE INTELLECTUS EMENDATIONE. Translated from the Latin of Benedict de Spinoza by *W. Hale White*. Translation Revised by *Amelia Hutchison Stirling, M. A.* (Edin.). New York: Macmillan & Co. Pages, 62. Price, $1.00.

The *Tractatus de Intellectus Emendatione* was one of the earliest works of Spinoza. We learn from the excellent Preface of the translator that Spinoza in a letter to Oldenburg in 1661 mentions having written a *complete* little treatise on the subject of the amendment of the understanding but had delayed the publication of it on account of the rancor of the theologians. As there is nothing in the present *Tractatus* answering to the points which Spinoza mentions as having developed there, the conclusion is natural that the original editors of the present work had in their hands only the first draft of the completed treatise, a conjecture confirmed by the fact that in the form in which we now have it, there are numerous gaps, lost references, and marked crudities and ambiguities of style. Besides, the conclusion is totally missing.

The purpose of the treatise is the discovery of the highest good and is thus moral not speculative. But the method itself is speculative, for according to Spinoza's view although speculation is not in itself the goal, it is yet the way by which the goal is to be reached. Consequently, for attaining the highest good, the reformation of intellectual procedure is the first thing to be taken in hand, and Spinoza accordingly describes his four modes of arriving at knowledge, all of which are now perfectly familiar to students of philosophy. Afterwards he takes up the problem of certainty and handles it in an interesting manner. "How do I know that I know?" "How am I sure that all science is not a delusion?" In all such interrogations he detects "the sophistry of the infinite regress." "If it be necessary that I should know that I know, it is necessary that I should know that I know that I know."

Interesting is his application of the same sophistry to prove that no tool which men use could ever have been invented. "It is the same with tools; and the "argument proceeds in the same way. For example, in order that iron may be "forged, we need a hammer; and if we are to have a hammer, we must make one.

"To this end we need another hammer and other instruments; and to obtain these "we shall need other instruments and so on *ad infinitum*. Thus anybody might "fruitlessly endeavor to prove that men are unable to forge iron. But inasmuch "as men at the beginning, with instruments furnished by nature, were able to make "certain very easy things, although with great labor and imperfectly, and with "these, when they were finished, made other and more difficult things with less "labor and more perfectly, and thus by degrees, advancing from the most simple "productions to tools, and from tools to other productions and tools, were able to "accomplish with small labor so many and such difficult things, so also the intel-"lect, by its own native force, forms for itself intellectual instruments by which it "acquires additional strength for other intellectual works, and from these works, "other instruments or power of further discovery, and thus by degrees advances "until it reaches the pinnacle of wisdom. That this is the way in which the in-"tellect proceeds will be easily seen, provided only we understand what is the "method of investigating the truth, and what are those instruments furnished by "nature which alone are required for the production of other instruments from "them in order to advance further."

Afterwards, follows a discussion of true or adequate ideas, of ideas of fancy, of false ideas and doubtful ideas. The second part of the method consists in "laying down rules whereby unknown things may be perceived in accordance with the standard of the true idea." The treatise breaks off abruptly with the remarks supplied by the old editors—*Reliqua desiderantur*. Nevertheless, as the old editors remark, despite the defects in the book, "it contains much that is remarkable and useful and not a little profitable to the sincere inquirer after truth." The unsigned preface preceding the translation is a lucid and exemplary piece of work.

The price of the book is rather high. T. J. McC.

ON GERMINAL SELECTION. By *August Weismann*. Chicago: The Open Court Publishing Co. 1896. Pages, xii, 61. Price, 25 Cents.

Professor Weismann's Essay on *Germinal Selection*, which was originally an address delivered before the International Congress of Zoölogists at Leyden, in September last, appeared first in *The Monist* for January, 1896, and not until afterwards in its original German version. In its present form it has been enriched by an appendix of thirteen pages discussing the history, bibliography, and present status of such questions as natural and chemical selection, variation and mutation, definitely directed variation, ultimate vital units, utility, internal evolutionary forces, etc., and further by a preface of twelve pages in which Professor Weismann sets forth his views on the method of scientific research, and defends the principles by which he has been guided in the elaboration of his theory of heredity and of his present doctrine of Germinal Selection. With regard to Germinal Selection itself, little need be said here, as its details are presumably already familiar to our readers. Its object is a rehabilitation of the principle of selection which outwardly seems

endangered by the upshot of recent researches, and the demolition of which would in Weismann's view be synonymous with the renunciation of all inquiry concerning the causal relation of vital phenomena. "Knowing this factor," he says, "we "remove, it seems to me, the patent contradiction of the assumption that the gen- "eral fitness of organisms, or the adaptations *necessary* to their existence, are pro- "duced by *accidental* variations—a contradiction which formed a serious stumbling- "block to the theory of selection. Though still assuming that the *primary* variations "are "accidental," I yet hope to have demonstrated that an interior mechanism "exists which compels them to go on increasing in a definite direction, the moment "selection intervenes. *Definitely directed variation exists*, but not predestined "variation, running on independently of the life-conditions of the organism, as "Naegeli, to mention the most extreme advocate of this doctrine, has assumed; on "the contrary, the variation is such as is elicited and controlled by those conditions "themselves though indirectly."

Interesting and valuable to scientists who have not pondered deeply on the ways of their work, are his remarks on the rôle of imagination in research and on the function of theory. He claims for his determinants and ids the same position in biological theory that Maxwell claimed for his mechanical fictions in the province of electricity. He regards them merely as representative models or pictures, or rather as analogues, by the manipulation of which we can mentally follow out the course and development of nature. If our theories serve this end, they have fulfilled their purpose. He contends there is absolutely no other choice left for us in the field of heredity. The problem is too minute for developmental mechanics ever to think of mastering it. In the place of facts impossible to observe, therefore, he claims to have put a theory based on facts, by the mutual interaction of which the approximate truth will be reached.

The value of the pamphlet, which appears in a very cheap but substantial form, as a number of the Religion of Science Library, is enhanced by the addition of an index. T.

INDUCTIVE LOGIC. By *Wm. G. Ballantine*, President of Oberlin College. Boston and London: Ginn & Co. 1896. Pages, 174. Price, 90 cents.

The student of logic must not expect to find in this booklet by the President of Oberlin College an exhaustive and original examination of the principles of inductive reasoning, but simply an attempt to "reproduce some of the excellencies" of Dr. Fowler's "bright and interesting" work, the *Elements of Inductive Logic*, while essaying to substitute a sounder analysis of fundamental principles. The manner in which the book has been compiled is based upon that of most of the newer text-books of logic, such as Jevons. Numerous extracts from scientific treatises have been cited as practical examples of reasoning and the discussion of the principles based upon the data therein found. These extracts are well chosen and eminently designed to enliven and diversify the study of the subject. In the presentation of

his points, whether original or borrowed, Mr. Ballantine is concise and clear. Altogether, the book is well adapted to intermediate academic instruction, although at the particular elementary stage of the educational course for which it is most suitable, most pupils have not yet attained a scientific grasp and breadth of vision which makes such a study a profitable undertaking. Into the author's points of logical doctrine we cannot enter. μκρκ.

BUDDHISM IN TRANSLATIONS. By *Henry Clarke Warren.* Cambridge: Harvard University. 1896. Pages, 520. Price, $1.20.

Mr. Henry Clarke Warren's book on Buddhism, will at once take a prominent place among Buddhistic publications. It is the first systematic collection of original translations from the southern canon of Buddhistic Scriptures, including not only passages of those books which have become accessible through the translations of other Pali scholars, but also new materials, for instance, selections from the Visudhimagga which had to be translated from manuscripts.

While Mr. Warren's book is to be recommended as an indispensable *vade-mecum* to all those who for one reason or another are interested in Buddhism, we must here state at once that the uninitiated will, naturally and necessarily, encounter great difficulties, for to appreciate the book one ought to understand the conditions under which Buddhism originated and the significance of the terms âtman, karma, nirvâna, etc., not only in their etymologies and definitions but also in their emotional potencies. Nirvâna may correctly be translated by extinction, but the word extinction does not find that same echo in our souls as nirvâna does in the souls of Buddhists to whom it is identical with a radical extinction of evil, sin, iniquity, pain, passion, hatred, and selfishness, which is regarded as the establishment of the highest bliss imaginable. Nirvâna corresponds to the Christian "heaven," yet it would be a mistake to translate it by the word "heaven"; for that which is commonly thought of when we speak of heaven, an eternal jubilee and glorification of God, would not be regarded as the highest bliss by Buddhists.. There may be, and there are, according to Buddhist conceptions, inhabitants of heaven who have not as yet attained nirvâna.

Mr. Warren has translated âtman by "ego," and sometimes by "self," and these words are the best rendering that can be found; but we must always bear in mind that âtman according to the definition of the Brahman philosophy in Buddha's days meant the "self" in the sense of an immutable, eternal soul-essence of man. The âtman was supposed to be that essential part of the soul which remains the same in all changes, and conditions the identity of a person; it was thought to be the soul itself, and was regarded as a distinct being, distinct from all faculties of the soul and distinct also from all soul-activity. Since Buddhism teaches that nothing is stable in this world, it naturally denies the existence of an âtman.

Buddhism, of course, does not deny the existence of an ego in the sense of the existence of self-consciousness. It only denies the metaphysical assumption that

the unity of man's self-consciousness implies that it is an immutable unit. Man's personality is by Buddha conceived as a compound, which as such is subject to the law of dissolution. While the existence of an âtman in the technical sense of the Brahman psychology is openly and squarely disavowed, the word âtman is nevertheless used in the common significance of "self." Thus we meet in the Dharmapada with such passages as this: "Self is the Lord? Who else should be Lord?" (verse 160), and "a man who controls himself enters the untrodden land through his own self-controlled self" (verse 323). But this "self" is the conscious condition that is expressed in the words "I will," and not the eternal âtman of the Brahman sages, it means "self" as we use the word in common parlance.

The truth is reiterated that all things in this world are compounds, and compounds are subject to the law of dissolution. There is an absolute non-existence of an âtman, of a stable, immutable, soul-substance, and thus Buddhism naturally appears at first sight as nihilistic. It seems to deny all that which according to the usual conception of the soul seems to be of value, and we may wonder why Buddhism appeared acceptable to anybody. Here lies the difficulty of comprehending Buddhism, and even some of its best expounders have failed to understand it properly. Men like Oldenberg look upon Buddhism as an ill-concealed negativism, and when the Buddha refuses to answer certain questions, such as whether the saint will live on after death or be annihilated, Oldenberg believes that the Buddha shirks an answer because he fears to shock the weak-minded hearer who would not be able to stand the full truth which clearly pointed to the reply that a saint would be annihilated after death. Mr. Warren here sees deeper than Oldenberg. Mr. Warren declares in his introductory discourse to Chapter II. that all the questions which Buddha left unanswered touch problems which according to his doctrines were out of court, "for these questions take for granted what he denies, "hence he refuses to give a Yes or No answer, just as any one of us might be ex- "cused for doing, in case any one were to be so impolite as to ask 'Have you left "off beating your mother?' The truth of no one of these theories could be allowed. "They are one and all heretical and incompatible with his doctrine."

Most palpable is this in a chapter taken from the Digha-Nikaya, § 67, pp. 310–311. Here a certain priest wants the question answered, "Where do these four elements, to-wit, the earthy element, the watery element, the fiery element, and the windy element, utterly cease?" He addresses all the sages, kings, and gods, until at last he comes to Brahma himself, and Brahma spoke to the priest as follows: "I, O priest, am Brahma, Great Brahma, the Supreme Being, the Unsurpassed, the Perceiver of All Things, the Controller, the Lord of All, the Maker, the Fashioner, the Chief, the Victor, the Ruler, the Father of All Beings Who Have Been and Are to Be."

The questioner not without a tinge of irony objects to this, saying: "My friend, I am not asking you, are you Brahma, Great Brahma, the Supreme Being, etc.? but I ask you 'Where do these four elements utterly cease?'" Brahma repeats his

self-glorifying speech three times, and then he takes the questioner by the arm, leads him aside, and speaks to him as follows:

"O priest, these gods of my suite believe as follows: 'Brahma sees all things; "knows all things; has penetrated all things.' Therefore was it that I did not "answer you in their presence. I, O priest, do not know where these four ele- "ments, to-wit, the earthy element, the watery element, the fiery element, and the "windy element utterly cease. Therefore it was a sin and a crime, O priest, that "you left the Blessed One, and went elsewhere in quest of an answer to this ques- "tion. Turn back, O priest, and having drawn near to the Blessed One, ask him "this question, and as the Blessed One shall explain unto you, so believe."

When the priest appears before the Blessed One, the latter says after some ntroductory remarks: "O priest, this question ought never to have been put thus, 'Reverend Sir, where do these four elements, to-wit, the earthy element, the watery element, the fiery element, and the windy element utterly cease?' But this, O priest, is how the question should have been put:

"O where doth water, where doth earth,
And fire, and wind no footing find?
And where doth long, and where doth short
And fine and coarse and good and bad,
And where do name and form both cease,
And turn to utter nothingness?

"And the answer is:

"In consciousness invisible
And infinite, of radiance bright,
O there doth water, there doth earth,
And fire and wind no footing find.
And there doth long, and there doth short,
And fine and coarse and good and bad,
And there do name and form both cease
And utter nothingness become.
And then, when consciousness hath ceased,
This all hath turned to nothingness."

Here Buddha directly states that the question "ought never to have been put thus," which means that the problem is wrongly formulated. The four elements do not utterly cease, but they only do not find a footing in him who has surrendered all attachment, who is free from desire, who has attained nirvâna.

The standpoint which Buddha assumes is so radically different from the standpoint of the Brahmans that their most important problems become irrelevant. The âtman does not exist, and therefore the attainment of nirvâna, consisting in the getting rid of illusion, is not an annihilation, for there is nothing to be annihilated. The reality of the world remains real as before. The first fault is that man thinks

of himself as an individual âtman which produces the fear of annihilation in death. The question whether man's self, his âtman, is annihilated in death or preserved, has no sense.

Buddha denies on the one hand the reality of an immutable being, of the ὄντως ὄν or Absolute Being such as it was conceived by the Eleatics, and on the other hand he denies the illusoriness of our experience and our deeds. Buddha is not an idealist in the sense that existence should be regarded as a sham. Avoiding the two extremes, he calls his doctrine the "middle doctrine."

But what is the reality that according to Buddha is real? Reality according to Buddha consists in the processes that are taking place, and the reality of living beings consists in their deeds. Reality is doing or acting, as the Germans call it *wirken*. Reality is *Wirklichkeit*. Buddha's doctrine is a strict monism. He does not divide the world into a creator and a creation, a doer and deeds, an enjoyer and enjoyment. Doing exists and the doer is a name given to the doing, as constituted by the groups of existence. There is *karma* but no *âtman*. Thus the world as it exists is a system of actions that are taking place, and every living being is the exact result of its own karma. The evil as well as the good is our own making, and of course every individual must be regarded as the present incorporation of a long history. It is the result of a development in previous lives. Individuals in the proper sense of the word, accordingly, do not exist. The individual as we conceive it is only a temporary incarnation of its own life-history, and it is this doctrine of deeds, or karma, which makes Buddhism so much akin to the theory of evolution.

The term "karma" has two meanings: first, it means deed, that is to say, the performance of definite actions, and then, the character which is constituted through deeds. Deeds leave traces and establish habits by repetition. They constitute what we call character, and while there is no âtman which transmigrates from one individual to another, there is a rebirth of character. The same characters appear again and again and perpetuate the species. In this way they constitute a conception which is not unlike the Christian idea of immortality. Mr. Warren says (p. 210): "It is the character of our friend, his particular set of deeds, or karma, "that we think of as surviving death, and this is exactly what the Buddhists do,— "the only difference being that we claim the existence of an ego. . . . The reader "will see, I think, that the two doctrines are really very similar, if we but leave the "postulation of an ego out of the question."

After these expositions we can explain what the Buddha regarded as the essence of our own being. Man has no right to call anything his own that he will lose again, not his property, not his family, not his slaves, not even his own body, and the present manifestations of his consciousness. His own consists in his karma, in the deeds which he performs, for they survive after death. This doctrine finds expression in the following verses:

"Nor grain, nor wealth, nor store of gold and silver,
Not one amongst his women-folk and children,

Nor slave, domestic, hired man,
Nor any one that eats his bread,
Can follow him who leaves this life,
But all things must be left behind.

"But every deed a man performs,
With body, or with voice, or mind,
'Tis this that he can call his own,
This with him take as he goes hence.
This is what follows after him,
And like a shadow ne'er departs.

"Let all, then, noble deeds perform,
A treasure-store for future weal;
For merit gained this life within,
Will yield a blessing in the next."

Buddha's doctrine is, in one word, anti-metaphysical. He denies the thing-in-itself, the âtman, the eternal, as a substance or entity. There is nothing permanent except the eternal truth that can be gained by enlightenment.

While Buddha's system was a definite philosophy which in spite of the many corruptions of the Pâli texts is in its outlines very clearly set forth, we cannot help admiring the practical spirit of the Great Teacher, the influence of which lasted for millenniums and will probably never be obliterated in his followers, even where they have degenerated and are in utter ignorance of the significance of his doctrines. Mr. Warren says of the Buddha in his introductory discourse to the first chapter: "In reading the Pâli Scriptures one is impressed with the strong personal "influence exercised by the Buddha over the hearts of his followers. He was re- "garded not as a mere formulator of dry metaphysical propositions, but as a very "wise and compassionate friend of his fellow-men. He was full of tact, and all "his ways were ways of peace. To allay discord he would tell a little story or fable "with a moral, and his epithet for one of whom he disapproved was merely 'vain "man.' Anger, in fact, had no place in his character, and the reader of this book "will find that it had equally none in his religio-philosophic system." P. C.

BHAKTI SATAKA. By *Râma Chandrabhârati*. With a Commentary by the *Rev. C. A. Seelakkhandha Thera*. Darjeeling: Buddhist Text Society of India. 1896.

The *Bhakti Sataka*, or "Hundred Lines of Faith," written in the beginning of the thirteenth century A. D. by Sri Râma Chandrabhârati, a pupil of Sri Rahula Sangha Raja, illustrates the virtues of the Buddha. The Rev. C. A. Seelakkhandha, of the Sailabimbarama Vihara at Dodanduwa, Ceylon, has undertaken to edit the *Bhakti Sataka* with a commentary, trusting that on account of its excellent style and the information it contains on Buddhism the poem will prove a very useful Sanskrit Reader for beginners.

The Reverend Seelakkhandha says in the preface:

"As it is my earnest desire to make the *Bhakti Sataka* useful to those who are, "at present, only imperfectly acquainted with Buddhism, I have written this com- "mentary called Ratnamala to enable them to easily understand the real meaning "of the text in accordance with the rules of Buddhism. In many instances, I have "quoted from other works on Buddhism. The author, Pandit Rama Chandrabha- "rati, having thoroughly acquainted himself with the tenets of Lord Buddha and "also with the accepted interpretation of his doctrine, and having accepted the "truth, as it is the duty of every learned man, and also having realised that there "is nothing more important than happiness in our next birth, followed the religion "of his conviction." κρς.

THE LITERARY STUDY OF THE BIBLE. An Account of the Leading Forms of Literature Represented in the Sacred Writings. Intended for English Readers. By *Richard G. Moulton, M. A.* (Cambr.), *Ph. D.* (Penna.), Professor of Literature in English in the University of Chicago. Boston: D. C. Heath & Co. 1895. Pages, 533.

THE MODERN READER'S BIBLE. A Series of Works from the Sacred Scriptures, Presented in Modern Literary Form. Edited, with an Introduction and Notes, by *Richard G. Moulton.* New York: Macmillan & Co. 1896. In small 18 mo. Volumes. Cloth, extra. Price, 50 cents each.

There is no need of the apology which Professor Moulton prefixes to his introductory remarks to the first of these works, touching its being a new increase to the number of books on the Bible. The work which he has attempted is so important, and the fruits which it is likely to bear are so tremendous, that one wonders the task was not attempted in English long before, although of a magnitude that would naturally repel anybody but a trained and indefatigable scholar. His work has been based upon the belief, "that the natural interest of sacred literature is considerably impaired by the form in which the Bible is usually read." The proper arrangement of the printed page, the distinction between prose and verse, the insertion of the names of speakers in dialogue, the assignment of characteristic titles, and the inclusion of a mass of totally diverse kinds of literature higgledy-piggledy in a single volume are matters of convenience and inconvenience which have never been considered in the editing of Bibles, and the lack of which, or the presence of which, has rendered the reading of Scripture if not a positive bore yet highly repellent to all except the most devout and untiring minds. The aversion of the average cultured reader to perusals of Scripture is certainly not based upon its lack of intrinsic interest. No one who has read such glowing and impassioned treatments of the literary prophets as are to be found in books like Cornill's *Prophets of Israel* can for a moment doubt the importance and fascination of the history and literature of this people. We may go farther than Professor Moulton and say that the fewness of those to whom the Bible appeals as literature is not due *in part*

but is due almost *entirely* to the forbidding form in which we allow the Bible to be presented to us. "Let the reader imagine the poems of Wordsworth, the plays of "Shakespeare, the essays of Bacon, and the histories of Motley to be bound to-"gether in a single volume; let him suppose the titles of the poems and essays cut "out, and the names of speakers and divisions of speeches removed, the whole di-"vided up into sentences of a convenient length for parsing, and again into lessons "containing a larger or smaller number of these sentences. If the reader can "carry his imagination through these processes, he will have before him a fair "parallel to the literary form in which the Bible has come to the modern reader."

As the author well says, here is common ground—this literary appreciation of Scripture—upon which the devout believer, the free thinker, the reverent scholar, and even opposing schools of criticism may meet. He has not attempted to embrace in his work all of the wide field denominated the literary study of the Bible, but has devoted most of his research and thought to one single aspect of the subject—*the treatment of literary morphology*: "how to distinguish one literary composition "from another, to say exactly where each begins and ends; to recognise Epic, Lyric, "and other forms as they appear in their biblical dress, as well as to distinguish "literary forms special to the Sacred writers." Hence has sprung the sub-title of the book—"An Account of the *Leading Forms of Literature* Represented in the Sacred Writings." The whole thus works up to what the author has called "A Literary Index of the Bible," ranging from Genesis to Revelation, and including the Apocryphal books of Wisdom and Ecclesiasticus. Using this Index, Professor Moulton says: "A student might mark these divisions and titles in the margin of his Revised Version, and so do for his Bible what the printer would do for all literature." The preferable plan, however, would be for the student to use the single volumes of Professor Moulton's *Modern Reader's Bible Series*, where this work has been done upon the actual printed page in excellent letter-press and typography.

Criticism and religious interpretation Professor Moulton leaves aside. For a literary appreciation, say of Deuteronomy, it is a matter of no import, he contends, whether this work was a composition of Moses or whether it was a fiction of the age of Josiah. Indifferent, however, as are the results of the Higher Criticism to a purely literary appreciation of the Bible, it is interesting to note that the literary treatment has often weighty suggestions to offer to the historical treatment. As a characteristic example Professor Moulton chooses a group of verses in the Book of Micah where even a casual reader remarks a sharply contrasted change of tone. Wellhausen sees in this changed tone evidence of a new composition. "Between verse 6 and verse 7," he says, "there yawns a century." "What really yawns between the verses," retorts Professor Moulton, "is simply a change of speakers." On the obvious assumption that the latter part of Micah is dramatic, all, in the Professor's view, is explained.

Another point of difference between the historical and literary treatments has regard to the "genuineness" of compositions. In the Higher Criticism "interpo-

lations" and "accretions" are frequently alluded to as something illegitimate. Professor Moulton rejects this imputation. In floating literature, such as the Hebrew literature largely was, there is no analogue of the modern idea of "originality." "My contention is that, whatever may be the truth as to dates, all the sec- "tions of such a poem as *Job* are equally 'genuine.' And as a matter of literary "analysis, I find the speeches of Elihu and the Divine Intervention, from whatever "sources they may have come, carrying forward the previous movement of the "poem to a natural dramatic climax, and in literary effect as striking as any part "of the book."

It remains for us to mention one additional point upon which Professor Moulton lays special emphasis—*the place in liberal education* of the Bible as literature. His plea on this head rises to the pitch of eloquence. He condemns the Mediæval narrowness and Renaissance paganism which compels our youth to draw their life's inspiration from the sensuous ideals of Greek and Roman antiquity, while neglecting the grand moral productions of Hebrew thought. "It is surely good "that our youth, during the formative period, should have displayed to them in a "literary dress as brilliant as that of Greek literature—in lyrics which Pindar can- "not surpass, in rhetoric as forcible as that of Demosthenes, or contemplative "prose not inferior to Plato's—a people dominated by an utter passion for right- "eousness, a people whose ideas of purity, of infinite good, of universal order, of "faith in the irresistible downfall of all moral evil, moved to a poetic passion as "fervid, and speech as musical, as when Sappho sang of love, or Æschylos thun- "dered his deep notes of destiny."

There is no gainsaying the wisdom and appositeness of this plea, and it is commendable that this ethical consideration, aiming at the formation of a nation's habits and thoughts, should in the production of the book have outweighed, or at least counterbalanced, matters of purely æsthetical and literary import. For literature and art are the handmaids, not the objects of life.

The work itself is divided into five "Books," exclusive of Introduction and Appendices. The Introduction takes up the Book of Job as a typical example and shows the various kinds of literary interest illustrated by it. It is found to contain specimens of epic, lyric, and dramatic composition, to have a philosophical and scientific interest, an interest of prophecy, and an adscititious interest in respect to rhetoric and versification. These "interests," and others, are then developed and applied in the six Books of the work, which bear respectively the titles: "Literary Classification Applied to the Sacred Scriptures;" "Lyric Poetry of the Bible;" "Biblical History and Epic;" "The Philosophy of the Bible, or Wisdom Literature;" "Biblical Literature of Prophecy;" "The Biblical Literature of Rhetoric." The Appendices are exhaustive and valuable, and give much needful material for the general reader in his study of the literary morphology of the Bible.

On the whole, *The Literary Study of the Bible* forms an excellent companion-book and guide to the little volumes which are issuing in *The Modern Reader's*

Bible Series, published by Macmillan, and arranged and edited by the same author. In this series the following, composing the Wisdom series, have already appeared: "The Proverbs;" "Ecclesiasticus;" "Ecclesiastes—Wisdom of Solomon;" and the "Book of Job." Each is provided with a special introduction, table of contents, prologues, epilogues, annotations, etc.,—everything in the style of a modern book. Their handy form, the elegance and taste displayed by both editor and publisher make them unusually attractive volumes.

THOMAS J. MCCORMACK.

THE UNITED STATES OF AMERICA. 1765–1865. By *Edward Channing, Ph. D.*, Assistant Professor of History in Harvard University. Cambridge [England]: University Press. 1896. [Cambridge Historical Series.]

So much has been said of the extent to which present relations between America and England are affected by instructions given in school concerning their old disputes and conflicts, that opportuneness will be at once conceded to the present volume. It is written especially for English readers, and comes with every guarantee of competency and fairness, as well as with the promise of enabling Englishmen to review, from the American standpoint, a century in which the histories of the two nations can hardly at any point be disconnected. The century is happily chosen. The first chapter, of forty pages, is a condensed and valuable prologue in which the colonial conditions and events which prepared the arena and led on to the struggles for nationality, are presented in broad outlines. Between the spring of 1765, when the Stamp-Act was imposed by Parliament, and the spring of 1865, when the restored Union was cemented by the blood of President Lincoln, lies the continuous history of American nationality, and Dr. Channing has shown good workmanship in compressing this century of events in the space of three hundred pages. Of course in that space, determined, no doubt, by editorial exigencies, some salient matters are necessarily omitted; but some suppressions are questionable. The proceedings of Governors Tryon in North Carolina and Dunmore in Virginia in fanning popular rage might at least have been referred to, though less striking than the case of Hutchinson in Massachusetts who was the first to put "independence" into the New England head. In trying to suppress the Tea troubles, he "rashly began an academic discussion as to the rights and duties of the colonists, proving conclusively that the position assumed by the colonists was unsound and that they must either submit or become independent." Dr. Channing regards the Stamp Act as constitutional but inexpedient. He is perhaps a little too tender in passing over the arrogant attitude of the English government towards American petitions, and the gratuitous ungraciousness which accompanied the repeal of the Stamp Act with a Declaratory Act affirming the right "to bind the colonies and people of America, subjects of the crown of Great Britain, in all cases whatsoever." Lord North told George III. that it was this Act, mere waste paper, which hurt the Americans most.

As a rule Dr. Channing avoids more than could be wished the sore points in his story for English readers, but in one instance we find a curious example of the permanence of unhistoric traditions even in seats of learning. Thus, in writing of the surrender of Burgoyne (page 92), he says:

"The Saratoga Convention stipulated that British soldiers should embark on "transports to be provided by their government, and should not serve again in "North America until exchanged. Weakness or good nature had induced Gates to "grant these terms. The convention was not carried out in good faith by either "party to it. The public property was not again given up by the British, and a "demand for a descriptive list of the prisoners drew from Burgoyne some ill-"advised words to the effect that the Convention had been broken by the Ameri-"cans. These things, trifling in themselves, may be held, in some slight degree, "to justify the Continental Congress in its refusal to ratify the Convention. The "real reason, however, for that action seems to have been a natural fear on the "part of the French government lest the Convention troops should be used against "them in Europe. On moral grounds this action of Congress cannot be defended, "but legally it was justifiable."

Documents cited in Fonblanque's Life of Burgoyne show that Gates's terms were the alternative of a life-and-death struggle; that there was not the slightest departure from good faith on the British side; and the justice of Burgoyne's "ill-advised words" is now justified by an authority which relieves the French of all participation in the matter. This authority is no less than that of Washington himself who, in a letter to the President of Congress (November 26, 1777), reminds him that so soon as the surrendered troops reach England, "the most scrupulous and virtuous observance of the convention will justify the ministry in placing them in garrison, and sending out others to reinforce General Howe." This letter will be found in Ford's "Writings of Washington," Vol. VI., page 225, and in the same volume, pages 245–248, 283, 293, 369, may be found further letters and notes of the means by which fulfilment of the convention was avoided.

Dr. Channing is generally careful in his treatment of international points, of later periods, so far as England is concerned, though, he occasionally makes questionable remarks. Thus, with regard to the Ashburton treaty it is said (p. 227): "It appears, however, that had Webster been correctly informed, he need not have yielded as much as he did as to the north-eastern boundary of Maine." The Secretary of State (Webster) had in his desk the red-lined map used by Franklin at the treaty of 1783, which coincided with the boundary claimed by England, and it is doubtful whether he would have got so much had this evidence been known to Lord Ashburton. (*Parl. Debates*, LXVII, 1183.)

The sixty-six pages allotted to the late Civil War are written with fairness to the South, but not always with due recognition of the small wires on which hung great weights, "The 'Horror of Fredericksburg'" (December 13, 1862), says Dr. Channing, "cost the Union army thirteen thousand men," but it might have been

added that the whole army might have been destroyed but for Lee's reluctance to shell the beloved little town, a tenderness which permitted Burnside's army to cross the Rappahannock on pontoons during the night. "The people of the western part of Virginia," says our author, "had no sympathy with secession. They were outvoted in the State Convention by the delegates from the eastern part of the State." But a majority of the eastern delegates were also opposed to secession, and the Virginia Convention was carried for secession solely by President Lincoln's proclamation of April 15, 1861, calling upon the States, Virginia included, for seventy-five thousand militiamen to march against the seven States which had seceded. That demand on the Virginians to march against their Southern brethren came while the State Convention was in session, and turned the Unionist majority into a minority. Had the President's proclamation been delayed a day or two, at most, Virginia would have adhered to the Union, for another Convention was impossible. It is doubtful whether without Virginia the Confederacy could have made much headway, and it is certain that our historian would not have had to record the startling figures that the war, in its two thousand four hundred actions, cost the whole country a million lives, and two thousand million pounds sterling. This may appear a moderate cost for what Dr. Channing regards as the result—settlement of the "two questions of slavery and nationality"; but as he declares the interpretation of the Constitution, as to the right of secession, as "historically uncertain," it seems strange that among the constitutional amendments that have grown out of the war none should affirm the inviolability of the Union.

Dr. Channing's little book is so well written, and in some matters so instructive, that with some revision and amendment in the light of historic justice, it might serve for educational uses. Unfortunately the Professor does not escape from the ruts worn by some of his predecessors, even though their traditional errors have been revealed by recent investigators. Prejudice is apt to be tyrannous in proportion to the importance of the things involved; and in American history especially the most vital questions are connected with certain eminent men on whom the historian's judgment cannot be pronounced uncritically without misleading his readers in matters more important than any individual. A Harvard professor—shall we say a Channing?—might be expected to speak with discrimination even of Tom Paine; but if that were too much to ask, surely he should not write of any historic figure in the following way: "Charles Lee, a renegade Englishman, committed treason many times; and of Horatio Gates, a recent immigrant to Virginia, it is difficult to speak with calmness. He was self-sufficient and cowardly; and he treated his subordinates with a spirit of unfairness and jealousy hardly to be conceived." If Dr. Channing possesses fresh information concerning these men, it should have been here adduced; so far as the facts have been published, it is left doubtful whether Lee was ever disloyal at heart to the American cause, and the charge of cowardice against Gates has never been proved. He did not anticipate his victory at Saratoga, and had prudently prepared means for retreat if necessary,

but we cannot think much would ever have been heard of this, or of Charles Lee's "treason," if the two men had not been accused of slighting Washington. Of Washington Dr. Channing says: "As a man, and as a leader of men, George Wash-"ington occupies an unique position among historic personages of ancient and "modern times. Other men have been more brilliant than he; but in no other "man have considerable abilities been combined with absolute honesty and stead-"fastness of purpose as they were in him." With such a view of the chieftain it must require exceptional self-restraint not to offer up promptly on his altar any one on whom he frowned, and our author's failures to exercise this self-restraint mar his history at several important points. Thus, he says of the Minister of the French Republic (1793):

"Landing at Charleston, Genet at once began the fitting out of privateers, and "seemed disposed to use the soil of the United States as if it were French territory. "Jefferson advised him to be moderate in his actions; but Genet not only broke "promises he had made to the Secretary of State, but he defied the Government. "Washington, after mature deliberation, decided to regard the treaty of 1778 as "not binding in this case. . . . Genet then appealed to the people against Wash-"ington" (p. 148).

Whether Genet broke any promises to the Secretary of State (Jefferson), or the latter broke his promises to Genet, is a question of veracity between the two men, and as our author describes Jefferson as "a political inventor," and "work-ing in the dark," it would seem that the notoriously frank and undiplomatic Genet might fairly claim his verdict. But as to the alleged appeal of Genet to the people against Washington, it was not charged at the time, but only that he had been heard to threaten that he would do so. This charge was made by John Jay and Rufus King, who were compelled to name Mr. Dallas as the man who heard the threat, and this drew from Dallas a complete denial of their story. The documents were all printed in the *American Historical Register*, November 1866.

Edmund Randolph, on whom the crisis of Washington's presidential career turned, is not even mentioned in Dr. Channing's book!

Another man unfortunate enough to fall under Washington's disapprobation was Monroe, who was the United States Minister in Paris during the excitement there over the British Treaty of 1795. "Instead," says Dr. Channing, "of trying to reconcile the French government to Jay's treaty, he increased the irritation which was felt in France by his petulant and undignified conduct, and returned to the United States in disgrace." On the contrary, Monroe, despite his dislike of the Treaty, had almost brought the French government to tolerate it, and it was his sudden recall that undid his work and brought France and the United States to the verge of war. So far from returning to America in disgrace, Monroe returned to become President of the United States, and our author himself is constrained to say, "Monroe's first administration was in many respects the most successful in

the history of the country," and that "the close of Monroe's (second) administration was in every respect the end of the "Era of Good Feeling."

These lapses are not numerous in Dr. Channing's book, but they are sadly significant. They could not have been made by any writer who had mastered even the published documents recently brought to light concerning Washington, Monroe, Edmund Randolph, Jefferson, Thomas Paine, much less searched into the mass of unpublished documents in our State archives. It is distressing to observe a similar lack of original research in most of the volumes which profess to deal in any compendious way with American history. McMasters, John Fiske, and now Dr. Channing, seem to think that our history can be written within the walls of their respective libraries, and do not appear to be aware that they are dealing summarily with facts, traditions, situations, affecting other countries, and even with the international relations of these countries at the present moment. A similar fault pervades most of the historical works of England and France, which are largely indictments of each other, based on partial investigations. There is great need of a real and thorough work, written by some English or American scholar, narrating with absolute impartiality the international history of America, England, and France, and without any bias of national pride in great names,—such as Washington, Franklin, Jefferson, Hamilton, Burke, Pitt, Fox, Napoleon, or any other conventionalised hero or bogey. These men had their virtues and their faults, and by both history was moulded; and the historian, occupying the House of the Interpreter, should never descend into the arena of the partisan conflicts whose meaning he is to unfold and whose results he is to trace out.

What young and brave student is there in the West who will consecrate himself to the task of giving to America and to Europe a history that exact thinkers and judicial patriots in both hemispheres shall welcome, and which may train the more cosmopolitan generation whose motto will be: "The world is my country, to do good my religion"?

M. D. CONWAY.

GRUNDRISS DER PSYCHOLOGIE. By *Wilhelm Wundt*. Leipsic: Wilhelm Engelmann. 1896, Pages, 392.

The psychological views of Professor Wundt are so well known, and his works on this and cognate branches so widely circulated, that it is unnecessary to speak of the character and tendency of his present concise *Rudiments of Psychology*, which after long solicitations he has at last been induced to give to the world. It will be sufficient to characterise its position with regard to the great psychologist's other works. The purpose of the *Rudiments* has been a twofold one: first, to place into the hands of Professor Wundt's pupils an outline of his oral course in psychology, an end which will meet the needs of nearly all students of the subject, and secondly, to provide for the general reader of culture, who wishes to get some conception of the work in modern psychology, a systematic survey of its most important results and theories. In consequence of this simplicity and limitation of pur-

pose, the exposition has been restricted to the simplest and most important facts, and all explanation of apparatus and experimenting has been omitted. Naturally, Professor Wundt has laid at the foundation of his treatment the views which he himself regards as the best, but he has not omitted to characterise briefly the principal psychological doctrines which diverge from his own.

We have now from Professor Wundt's pen three formal and important works on psychology proper. The first is his celebrated voluminous treatise on the *Elements of Physiological Psychology*, which, if it has not been nominally translated, has yet been partially paraphrased in American text-books. This treatise was devoted to the exposition of the methods for applying the procedures of physical science to the investigation and analysis of psycho-physical facts, and of the results which had been reached by the application of those methods. General considerations, of course, were here forced into the background. The second work is the new edition of his *Lectures on Human and Animal Psychology*, which has been translated into English by Professors Titchener and Creighton, of Cornell. This is a more popular attempt at giving the character and purpose of experimental psychology, but at the same time it includes discussions of more general philosophic import. In other words, the first work laid greatest stress upon the relations of psychology to physiology, the second emphasised principally the philosophical points of view, while the present work or *Rudiments* is devoted to the presentation of psychology in that special orderly form and systematic arrangement which is the outcome of Professor Wundt's experience and judgment on the methodology of the subject. The author himself regards it in this point of view as a helpful supplement to all his previous psychological works and especially to his formal views, as stated in the section entitled "The Logic of Psychology," in the second volume of the second part of the second edition of his Logic.

The treatment itself falls under four heads exclusive of the Introduction, where the problems, theories, and methods of psychology are discussed. The first head is called "Psychical Elements," where simple sensations and feelings are considered. The second is called "Psychical Compounds" (*Gebilde*), where the subjects of intensive and spatial percepts, temporal, visual, and auditive percepts, composite feelings, emotions, and volitions are discussed. The third bears the title of the "Relations between the Psychical Compounds," and treats of consciousness and attention, association, memory, apperceptive combinations, psychical states, etc. The fourth is entitled "Products of Psychical Evolution." Here are emphasised the psychical attributes of animals, the psychical evolution of the child, the evolution of intellectual communities, embracing language, mythology, and customs. The last and fifth head bears the title of "Psychical Causality and its Laws." The notion of the soul, the psychological laws of relation, and the psychological laws of evolution are here dwelt upon. The whole comprises about 384 pages, making the exposition, thus, a model of conciseness, as it is also with respect to the richness and importance of the material offered. μκρκ.

ON MEMORY, AND THE SPECIFIC ENERGIES OF THE NERVOUS SYSTEM. By *Prof. Ewald Hering.* Chicago: The Open Court Publishing Co. Pages, 50. Price, 15 cents.

Students have now accessible in a cheap form both the classical memoir of Hering "On Memory," and his equally well-known article on "The Specific Energies of the Nervous System. Hering has rarely unbent himself to popular and untechnical expression; in fact, with the exception of these two essays, we know of hardly another case of his having done so in all his published works. But he is certainly a master in the art of giving abstruse results in concise and simple form. More of such work would have been a boon to the semi-scientific world, and it is safe to say that much of his high reputation, even among inquirers, or at least among such as have not worked in just his specialty, is due to the success of the essays comprised in this little book. ω.

L'ANNÉE PSYCHOLOGIQUE. Publiée par MM. H. Beaunis et A. Binet. Paris: Félix Alcan. 1896. Pages, 1010. Price, 15 fr.

The Messrs. Beaunis and Binet are to be congratulated upon the success of the undertaking born into life in this portly volume. The *Année Psychologique* counts among its collaborators Professor Ribot of the Collège de France, M. Victor Henri, now engaged in the Laboratory of Wundt, at Leipsic, MM. Azoulay, Biervliet, Bourdon, Chaslin Courtier, Flournoy, Forel, Gley, Passy, Philippe, Xilliez, and Mlle. Sczawinska. The laudable purpose of the *Année* has been (1) to present a series of original and representative memoirs by leading psychologists; (2) to present an account of the work done in the Laboratory of Physiological Psychology at Paris; (3) to present general systematic synopses of the work done in certain extremely special departments of psychological research and thought, the choice of which seems largely dictated by the taste of the collaborators; (4) analytical notices of the main works which have appeared in psychology and cognate subjects; (5) and lastly, a biographical index of everything which has appeared upon psychology or upon any subject relating to psychology during the entire preceding year (1895). This last list includes 1394 titles. The original memoirs are by (1) Ribot, "Abnormal Morbid Characters;" (2) Forel, "Bird's-eye View of Comparative Psychology;" (3) Flournoy, "On Time of Reading and Omission;" (4) Bourdon, "On Intellectual Phenomena;" (5) Gley, "On Conditions Favoring Hypnosis;" (6) Biervliet, "Illusions of Weight." In the accounts of special departments of research we have an article by Azoulay, who is something of a spelling-reformer, on "Histological Psychology;" an article by V. Henri on "The Space-Sense of the Skin;" by J. Passy, on "Olfactive Sensations;" by A. Binet and V. Henri, on "Individual Psychology," and lastly, one by V. Henri, on "The Calculation of Probabilities in Psychology."

The labor involved in the compilation of this large work has been enormous and its convenience will be appreciated by all students of psychology. Annual sub-

scriptions to the *Année Psychologique* costs for foreign countries 15 francs, and may be addressed to M. Binet, at the Sorbonne, Paris. μ.

THE PSYCHOLOGICAL INDEX, No. 2. A Bibliography of the Literature of Psychology and Cognate Subjects for 1895. Compiled by *Livingston Farrand*, Columbia College, and *Howard C. Warren*, Princeton University. New York and London: Macmillan & Co. Price, 75 cents.

PRINCETON CONTRIBUTIONS TO PSYCHOLOGY. Reprinted from the *Psychological Review*. Edited by *J. Mark Baldwin*. Princeton: The University Press. January, 1896. Pages, 49. Price, 50 cents.

The number of titles of the various books, pamphlets, articles, and utterances connected in any way with the subject of psychology for the year 1895, amounts, according to this issue of *The Psychological Index*, to 1394. This number agrees with that given in the bibliographical table of the *Année Psychologique* of MM. Beaunis and Binet. The two lists appear in fact to be identical, and were no doubt compiled in concert. It was certainly a deserving task, and that issued by the *Psychological Review* is in excellent typographical form.

The second brochure listed above is No. 3 of the *Princeton Contributions to Psychology*, being a reprint from the *Psychological Review*. It contains three articles: I. "The Perception of two Points not the Space-Threshold," by Guy Tawney; II. "The Origin of a Thing and its Nature," by J. Mark Baldwin; III. "Something More About the 'Prospective Reference' of Mind," by W. M. Urban. The *Contributions* are to appear semi-annually.

In the same group we may mention a paper on *Association* (56 pp.), by Mary Whiton Calkins, which appears as a monograph supplement to *The Psychological Review*. μ.

STUDIES FROM THE YALE PSYCHOLOGICAL LABORATORY. Edited by *Edward W. Scripture, Ph. D* Vol. III. New Haven, Conn.: Yale University. 1895. Pages, 109. Price, $1.00.

The *Studies* for 1895 open with a long article on "Measurements of Illusions and Hallucinations in Normal Life," by C. E. Seashore. This is followed by some "Studies of Fatigue" by John M. Moore, and by "Some Experiments on the Reaction-Time of a Dog" by Edward M. Weyer. It closes with a description of "Some New Apparatus" by E. W. Scripture. ρμ.

AN EXAMINATION OF WEISMANNISM. By *George John Romanes, F. R. S.* Chicago: The Open Court Publishing Co. 1896. Pages, 221. Price, 35 cents.

This is one of the latest additions to the Religion of Science Library. It is printed upon the same paper as the cloth edition and also contains a fine photogravure portrait of Weismann as its frontispiece. Romanes's *Examination of Weismannism* was to have formed part of his work *Darwin, and After Darwin*, but

as his criticism grew under his hands he determined to publish his *Examination* separately. He has considered only the theories which Weismann has reared upon the fundamental postulate of the non-inheritance of acquired characters having reserved for Part II. of his *Darwin, and After Darwin*, which has since appeared, the question of the validity of that postulate itself. The glossary of technical terms is a helpful addition to the work. ω.

STUDIES IN THE PSYCHOLOGY OF RELIGIOUS PHENOMENA: The Religious Motive, Conversion, Facts, and Doctrines. By *James H. Leuba*, Fellow in Psychology at Clark University. Worcester, Mass. 1896. Pages, 76.

Consonantly with the practical trend of modern research, which has also affected psychology, Mr. Leuba proposes here to take up the manifestations of religious life which have hitherto been ignored. He says: "If religion has any "reality, it must perforce express itself in psychic and physiological phenomena. "The work of a true Science of Religion, as we understand it, is to find out what "these subjective manifestations are, and then to treat them as it would any other "psychic fact." His method has been the presentation of extracts from well-known religious documents, in the light of which he analyses such states of mind and body as conversion, surrender, justification, faith, etc. The present pamphlet, which is mainly concerned with psychic facts, is to be followed by a concluding essay which will be chiefly theoretical and speculative, and will point out the possible physiological correlates of the phenomena here considered. μ.

ENDOKANNIBALISMUS. By *Dr. Rudolf S. Steinmetz*. Wien: Anthropologische Gesellschaft. 1896. Pages, 60.

This brochure is an extract from the Proceedings of the Anthropological Society of Vienna and will be interesting to ethnologists who are occupied with the study of anthropology. By endocannibalism is understood the practice of eating members of one's own race as distinguished from members of another. The study of cannibalism generally suffers from the drawback that there are few ethnologists who are personally desirous of investigating the facts. Long sojourns among anthropophagi are attended with dangers which few are willing to risk.

DIE DENKSCHÖPFUNG UMGEBENDER WELT AUS KOSMOGONISCHEN VORSTELLUNGEN IN CULTUR UND UNCULTUR. By *A. Bastian*. Berlin: Ferd. Dümmler. 1896.

Dr. Bastian's works follow one another in rapid succession and in undiminishing bulk, so that we have constant occasion to wonder at the inexhaustible resources of his erudition and world-wide experience. The present book is a comparative survey of the cosmogonic conceptions of civilised and uncivilised people. The discussion embraces almost every possible aspect of the world's thought on creation, and on everything relating to creation: it would be impossible to suggest a subject in this connexion that has not been broached. As we have had occasion to remark

before of Dr. Bastian's other works, this book, too, is in absolute want of an analytical index. Several plates and tables are appended. μ.

DIE LEHRE VON DEN SPEZIFISCHEN SINNESENERGIEN. By *Dr. Rudolf Weinmann.* Hamburg and Leipsic: Leopold Voss. 1895. Pages, 96. Price, M. 2.50.

WIRKLICHKEITSSTANDPUNKT. Eine erkenntnistheoretische Skizze. By *Dr. Rudolf Weinmann.* Hamburg and Leipsic: Leopold Voss. 1896. Pages, 37. Price, M. 0.80.

The work of Dr. Weinmann is an attempt at a historical, systematic, and critical exposition of the doctrine of the specific energies of the nervous system. He has divided his booklet into three parts, the first giving in general outlines the origin and history of the idea of the specific energies, the second a systematic critical statement of the principle, and the third an epistemological discussion of its scope and import. The author pretends to advance no new facts regarding the nature of the specific energies as such; he believes, however, that they require explanation, being by their very nature a renunciation of explanation; and finally, it is his opinion that the doctrine has merely a physiological interest, being entirely bereft of epistemological import. We may refer our readers who are not acquainted with German, and who wish to obtain a clear notion of what the specific energies mean, to the admirably clear exposition of Prof. Ewald Hering which was recently published in the *Religion of Science Library.*

In the second pamphlet Dr. Weinmann discusses certain epistemological problems in the light of a criticism of Kant's subjective realism. μ.

ERRATUM.

On page 322 of the April, 1896, *Monist*, line 10 from the bottom (article, Mach's *Stereoscopic Application of Röntgen's Rays*), "*by* the intermediation of photography" should read "*without* the intermediation of photography."

It was the object of the experiment proposed by Professor Mach, not to use photography, but to do away with photography. In the meantime, a stereoscopic picture of a human hand, with the bones, and with colored liquid injections in the blood-vessels, has, at the suggestion of Professor Mach, been taken by Professor Pfaundler of the University of Graz.

PERIODICALS.

THE PSYCHOLOGICAL REVIEW. VOL. III. No. 3.

STUDIES FROM THE PSYCHOLOGICAL LABORATORY OF THE UNIVERSITY OF CHICAGO. (I.) Reaction-Time; A Study in Attention and Habit: *James Rowland Angell* and *Addison W. Moore*. (II.) A Study of Visual and Aural Memory Processes: *Lewis Grant Whitehead*.—STUDIES FROM THE HARVARD PSYCHOLOGICAL LABORATORY. (V.) The Æsthetics of Simple Forms: *Edgar Pierce*. A New Perimeter: *James E. Lough*.—THE ACCURACY OF RECOLLECTION AND OBSERVATION. By *Frederick E. Bolton*.—DISCUSSION, ETC.—(New York: Macmillan & Co., 66 Fifth Avenue.)

THE AMERICAN JOURNAL OF PSYCHOLOGY. Vol. VII. No. 3.

A STUDY IN THE PSYCHOLOGY OF RELIGIOUS PHENOMENA. By *James H. Leuba*.—COLOR-SATURATION AND ITS QUANTITATIVE RELATIONS. By *August Kirschmann, Ph. D.*—MINOR STUDIES FROM THE PSYCHOLOGICAL LABORATORY OF WELLESLEY COLLEGE.—A STUDY OF DREAM CONSCIOUSNESS. By *Sarah C. Weed, Florence M. Hallam*, and *Emma D. Phinney*.—A LABORATORY COURSE IN PHYSIOLOGICAL PSYCHOLOGY, VI. By *Edmund C. Sanford*.—PSYCHOLOGICAL LITERATURE.—NOTES.—(Worcester, Mass.: J. H. Orpha.)

THE PHILOSOPHICAL REVIEW. Vol. V. No. 3.

LOTZE'S MONISM. By *F. C. S. Schiller*.—THE CATEGORY OF SUBSTANCE. By *Prof. Walter Smith*.—SOME ASPECTS OF HEGEL'S PHILOSOPHY. By *Prof. Hiralal Haldar*.—THE LIMITATIONS OF THE INTROSPECTIVE METHOD IN ETHICS. By *Dr. Frank C. Sharp*.—BOOK REVIEWS, ETC.—(Boston, New York, Chicago: Ginn & Co.)

MIND. NEW SERIES, No. 18.

THE CONCEPTION OF IMMORTALITY IN SPINOZA'S *Ethics*. By *A. E. Taylor*.—PLATO'S EARLIER THEORY OF IDEAS. By *R. P. Hardie*.—SENSE, MEANING, AND INTERPRETATION. (II.) By *V. Welby*.—CHARACTER AND THE EMOTIONS. By *Alexander F. Shand*.—DISCUSSIONS, ETC.—(London and Edinburgh: Williams & Norgate.)

REVUE PHILOSOPHIQUE. Vol. XXI. Nos. 3, 4, 5, and 6.

MÉMOIRE ET RECONNAISSANCE (I.) By *H. Bergson*.—LA VIE ET LA MORT. II. LES MÉTAZOAIRES (Concluded). By *F. le Dantec*.—LE LOBE OCCIPITAL ET LA VISION MENTALE. (Concluded.) By *J. Soury*.

GÉNÉRALISATION ET INDUCTION (I.) By *G. Fonsegrive.*—MÉMOIRE ET RECONNAISSANCE (Concluded). By *H. Bergson.*—CIVILISATION ET NÉVROPATHIE. By *Ch. Féré.*

NÉCESSITÉ D'UNE INTERPRÉTATION PSYCHOLOGIQUE ET SOCIOLOGIQUE DU MONDE. By *A. Fouillée.*—L'ÉVOLUTION CHIMIQUE DE L'ESPÈCE. By *F. Le Dantec.*—GÉNÉRALISATION ET INDUCTION (Concluded). By *G. Fonsegrive.*

RECHERCHES EXPÉRIMENTALES SUR LA JOIE ET LA TRISTESSE. I. LA JOIE. By *G. Dumas.*—DE L'INVOLUTION ET DE L'ORDRE RESPECTIF DES IDÉES, RÉVÉLÉS PAR LE LANGAGE. By *R. de la Grasserie.*—LA MAIN, LA PRÉHENSION ET LE TOUCHER. By *Ch. Féré.*—ANALYSES ET COMPTES RENDUS, ETC.—(Paris: Félix Alcan.)

REVUE DE MÉTAPHYSIQUE ET DE MORALE. Vol. IV. Nos. 2 and 3.

RECHERCHE D'UNE MÉTHODE EN PSYCHOLOGIE (I.). By *G. Remacle.*—SUR QUELQUES RELATIONS DE LA PENSÉE THÉORIQUE AVEC LES INTÉRÊTS PRATIQUES. By *G. Simmel.*—NOUVELLES ESQUISSES DE PHILOSOPHIE CRITIQUE (V.): LA NORME DE LA PENSÉE ET L'ENCHAINEMENT DES CHOSES. By *A. Spir.*—LA COURBURE ET LA DISTANCE EN GÉOMÉTRIE GÉNÉRALE. By *G. Lechalas.*

PERCEPTION ET MATIÈRE. By *H. Bergson.*—LA SCIENCE RATIONNELLE. By *G. Milhaud.*—SUR UN JUGEMENT ESTHÉTIQUE DE SCHOPENHAUER. By *A. Beaunier.*—NOUVELLES ESQUISSES DE PHILOSOPHIE CRITIQUE (continued): ESSAI SUR LES FONDEMENTS DE LA RELIGION ET DE LA MORALE. By *A. Spir.*—ETUDES CRITIQUES.—(Paris: Armand Colin & Cie.)

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. X. Nos. 3, 4, 5 and 6. Vol. XI. Nos. 1 and 2.

UNTERSUCHUNGEN ÜBER DIE GEISTIGE ENTWICKELUNG DER SCHULKINDER. By *E. W. Scripture.*—ENTSTEHUNG UND BEDEUTUNG DER SYNOPSIEN. By *Richard Hennig.*—ZUR ANALYSE DER VORSTELLUNGEN VON ABSTAND UND RICHTUNG. By *Alois Höfler.*—UEBER DIE WIRKUNG DES CHLORSAUREN KALI AUF DEN GESCHMACKSSINN.—By *Wilibald A. Nagel.*—UEBER DAS IRISIEREN SEHR GROB ORNAMENTIERTER FLÄCHEN BEI GLEICHZEITIGEM AUFTRETEN VON SIMULTANKONTRAST. By *Richard Hilbert.*

ZUR PSYCHOPHYSIK DER GESICHTSEMPFINDUNGEN. By *G. E. Müller.*—BESCHREIBUNG EINES NEUEN CHRONOGRAPHEN. By *Raymond Dodge.*—UEBER KONTRAST UND KONFLUXION (II.). By *F. C. Müller-Lyer.*—UEBER J. VON UEXKÜLLS VERGLEICHEND-SINNESPHYSIOLOGISCHE UNTERSUCHUNG (I.). By *Wilibald A. Nagel.*

DIE WAHRNEHMUNG VON TONVERÄNDERUNGEN (I.). By *L. William Stern.*—AESTHETISCHE UNTERSUCHUNGEN IN ANSCHLUSS AN DIE LIPPSCHE THEORIE DES KOMISCHEN (I.). By *G. Heymans.*—SPEKTROBOLOMETRISCHE UNTERSUCHUNGEN ÜBER DIE DURCHLÄSSIGKEIT DER AUGENMEDIEN FÜR ROTE UND ULTRAROTE STRAHLEN. By *F. Aschkinass.*

UEBER DIE BEDEUTUNG DES WEBERSCHEN GESETZES (I.). By *A. Meinong.*—ZUR DIAGNOSE PSYCHISCHER VORGÄNGE MIT BESONDERER BEZUGNAHME AUF HAMLETS GEISTESZUSTAND. By *S. Landmann.*—LITTERATURBERICHT.—(Hamburg and Leipsic: Leopold Voss.)

ARCHIV FÜR SYSTEMATISCHE PHILOSOPHIE. Vol. II. Nos. 1 and 2.

ZUR KLASSIFIKATION DER WISSENSCHAFTEN. By *A. Stadler.*—ZUR PSYCHOLOGIE DER METAPHYSIK. By *R. Lehmann.*—UEBER DAS PSYCHOPHYSISCHE GESETZ. By *W. Dittenberger.*—VON DER WERTDEFINITION ZUM MOTIVATIONSGESETZE. By *Chr. v. Ehrenfels.*

DER BEGRIFF DES DASEINS UND DAS ICH-BEWUSSTSEIN. By *J. Bergmann.*—IDEE UND PERSÖNLICHKEIT. By *M. J. Monrad.*—UEBER EINIGE GRUNDFRAGEN DER KANTISCHEN PHILOSOPHIE. By *F. Staudinger.*—IST DAS SITTENGESETZ EIN NATURGESETZ? Bemerkungen zum vorstehenden Aufsatz F. Staudingers. By *P. Natorp.*—DIE WANDLUNGSFORMEN DES EIGENTUMSBEGRIFFS. By *L. Stein.*—(Berlin: Georg Reimer.)

VIERTELJAHRSSCHRIFT FÜR WISSENSCHAFTLICHE PHILOSOPHIE. Vol. XX. Nos. 1 and 2.

ENTWICKLUNGSFAKTOREN DER NIEDERLÄNDISCHEN FRÜHRENAISSANCE. Ein Versuch zur Psychologie des künstlerischen Schaffens (I.). By *Fr. Carstanjen.*—DAS GESETZ DER UEBUNG. By *H. Cornelius.*—DER EMPIRIOKRITIZISMUS ALS EINZIG WISSENSCHAFTLICHER STANDPUNKT (I.). By *R. Willy.*

ZUM LEBEN SPINOZAS UND DEN SCHICKSALEN DES TRACTATUS THEOLOGICOPOLITICUS. By *M. Guggenheim.*—ENTWICKLUNGSFAKTOREN DER NIEDERLÄNDISCHEN FRÜHRENAISSANCE. Ein Versuch zur Psychologie des künstlerischen Schaffens. (Concluded). By *Fr. Carstanjen.*—DER EMPIRIOKRITIZISMUS ALS EINZIG WISSENSCHAFTLICHER STANDPUNKT (II.). By *R. Willy.*—(Leipsic: O. R. Reisland.)

KANTSTUDIEN. Vol. I. No. 1.

ZUR EINFÜHRUNG. By the *Editor.*—DIE BEWEGENDEN KRÄFTE IN KANTS PHILOSOPHISCHER ENTWICKLUNG UND DIE BEIDEN POLE SEINES SYSTEMS. I. By *E. Adickes.*—GOETHE'S VERHÄLTNIS ZU KANT IN SEINER HISTORISCHEN ENTWICKLUNG. (I.) By *K. Vorländer.*—§ 1 DER TRANSCENDENTALEN AESTHETIK. (I.) Aus einem Konversatorium für Anfänger. By *A. Stadler.*—KANT ET FICHTE ET LE PROBLÈME DE L'ÉDUCATION. By *A. Pinloche.*—RECENSIONEN, ETC.—(Hamburg and Leipsic: Leopold Voss.)

The universality of Kant's mind, his continued ascendancy in the intellectual world, and the recent reversion of philosophical thought to his point of view, gave rise to a plan which Dr. Vaihinger of Halle has long cherished and now finally realised in the publication of a periodical devoted to the investigation of all the phases of Kant's life and activity. The *Kantstudien* will appear irregularly and cost 12 Marks per volume. It is to be similar in its aims to the type of journals devoted to the study of Shakespeare, Goethe, etc. The collaborators are E. Adickes, E. Boutroux, Edw. Caird, C. Cantoni, J. E. Creighton, W. Dilthey, B. Erdmann, K. Fischer, M. Heinze, R. Reicke, A. Riehl, W. Windelband, and others. Prospectus and specimen copy will be sent on applying to Leopold Voss, Hamburg.

GENERAL LIBRARY,
UNIV. OF MICH.
8 JUL 1896

VOL. 76. No. 4. JULY, 1896.

THE MONIST

A QUARTERLY MAGAZINE.

Editor: DR. PAUL CARUS. *Associates:* { EDWARD C. HEGELER / MARY CARUS.

CONTENTS:

PAGE

THE HOLINESS OF INSTINCT.
PROF. WOODS HUTCHINSON - - - - - - - - 481

PHILOSOPHICAL TERMINOLOGY AND ITS HISTORY.
PROF. RUDOLF EUCKEN - - - - - - - - - 497

ON THE ORIGIN AND IMPORT OF THE IDEA OF CAUSALITY.
PROF. F. JODL - - - - - - - - - - - 516

SCIENCE AND FAITH. II. Introduction to Man as a Member of Society.
DR. PAUL TOPINARD - - - - - - - - - - 534

THE PROBLEM OF GOOD AND EVIL.
EDITOR - - - - - - - - - - - - - 580

LITERARY CORRESPONDENCE. France.
LUCIEN ARRÉAT - - - - - - - - - - - 600

BOOK REVIEWS.—PERIODICALS. [For particulars see inside title-page.] - - 608–640

CHICAGO:

THE OPEN COURT PUBLISHING CO.

LONDON: 17 Johnson's Court, Fleet St. E. C.

Price, 50 cts.; Yearly, $2.00. In England and U. P. U., 2s 6d; Yearly, 9s 6d.

Copyright, 1896, by the Open Court Publishing Co. Entered at the Chicago Post Office as Second-Class Matter.

THE MONIST.

A QUARTERLY MAGAZINE OF

PHILOSOPHY, RELIGION, SCIENCE, AND SOCIOLOGY,

PUBLISHED BY

THE OPEN COURT PUBLISHING COMPANY,

MONON BUILDING, 324 DEARBORN STREET, CHICAGO, ILL.

POST-OFFICE DRAWER F.

AGENTS AND TERMS OF SUBSCRIPTION.

LONDON: The Open Court Pub. Co., 17 Johnson's Court, Fleet St., E. C. Single Copies, 2s. 6d.		Yearly, 9s. 6d.
LEIPSIC: Otto Harrassowitz	Mk. 2.50	Mk. 9.50
ROTTERDAM: H. A. Kramers & Son	——	Fl. 6.60
TURIN: PALERMO: Libreria Carlo Clausen	——	Lire 12
BOSTON: Damrell & Upham, 283 Washington Street	50 cents	$2.00

Postpaid to New South Wales, Victoria, Queensland, Tasmania. and New Zealand, and all countries in U. P. U., for one year, $2.25.

SOME NOTABLE ARTICLES WHICH HAVE APPEARED IN THE MONIST.

VOLUME I., NO. 1.

MR. A. R. WALLACE ON PHYSIOLOGICAL SELECTION — GEORGE J. ROMANES, F.R.S.
THE IMMORTALITY OF INFUSORIA — ALFRED BINET
THE ANALYSIS OF THE SENSATIONS — PROF. ERNST MACH
THE ORIGIN OF MIND — DR. PAUL CARUS
THE MAGIC MIRROR — MAX DESSOIR

VOLUME I., NO. 2.

THE ARCHITECTURE OF THEORIES — CHARLES S. PEIRCE
THE SQUARING OF THE CIRCLE — PROF. HERMANN SCHUBERT
THE CRITERION OF TRUTH — DR. PAUL CARUS
THE PSYCHOLOGY OF THE STAR-FISH — CARUS STERNE

VOLUME I., NO. 3.

THE FACTORS OF EVOLUTION — JOSEPH LE CONTE
THE PHYSIOGNOMY OF THE ANARCHISTS — PROF. CESARE LOMBROSO
MISONEISM AND PHILONEISM — PROF. CESARE LOMBROSO

VOLUME I., NO. 4.

PSYCHOLOGY OF CONCEPTION — JAMES SULLY
A CONVICTED ANARCHIST'S REPLY TO PROFESSOR LOMBROSO — MICHAEL SCHWAB
THE PRINCIPLE OF WELFARE — PROF. HARALD HOEFFDING
THE CRITERION OF ETHICS AN OBJECTIVE REALITY — DR. PAUL CARUS
ON THOUGHT AND LANGUAGE — PROF. MAX MUELLER

VOLUME II., NO. 1.

THE PRESENT POSITION OF LOGICAL THEORY — PROF. JOHN DEWEY
WILL AND REASON — B. BOSANQUET
ETHNOLOGICAL JURISPRUDENCE — JUSTICE ALBERT H. POST
THOUGHT AND LANGUAGE — GEORGE JOHN ROMANES, F.R.S.

VOLUME II., NO. 2.

MENTAL EVOLUTION — PROF. C. LLOYD MORGAN
FACTS AND MENTAL SYMBOLS — PROF. ERNST MACH
ARE THERE THINGS IN THEMSELVES? — DR. PAUL CARUS

VOLUME II., NO. 3.

THE DOCTRINE OF NECESSITY EXAMINED — CHARLES S. PEIRCE
ON CRIMINAL SUGGESTION — PROF. J. DELBŒUF

VOLUME II., NO. 4.

OUR MONISM — PROF. ERNST HAECKEL
THE MAGIC SQUARE — PROF. HERMANN SCHUBERT
THE LAW OF MIND — CHARLES S. PEIRCE
MR. CHARLES S. PEIRCE'S ONSLAUGHT ON THE DOCTRINE OF NECESSITY — DR. PAUL CARUS

VOLUME III., NO. 1.

MAN'S GLASSY ESSENCE — CHARLES S. PEIRCE
THE NERVOUS GANGLIA OF INSECTS — DR. ALFRED BINET
HINDU MONISM — PROF. RICHARD GARBE
THE IDEA OF NECESSITY — DR. PAUL CARUS

Catalogue of Publications

OF THE

OPEN COURT PUBLISHING COMPANY.

F. MAX MÜLLER.

THREE INTRODUCTORY LECTURES ON THE SCIENCE OF THOUGHT.
With a correspondence on "Thought Without Words," between F. Max Müller and Francis Galton, the Duke of Argyll, George J. Romanes, and others. 128 pp. Cloth, 75c. Paper, 25c.

THREE LECTURES ON THE SCIENCE OF LANGUAGE.
Oxford University Extension Lectures. Supplement, "My Predecessors." 112 pp. Cl., 75c. Pa., 25c.

GEORGE JOHN ROMANES.

DARWIN AND AFTER DARWIN.
An Exposition of the Darwinian Theory and a Discussion of Post-Darwinian Questions.
1. THE DARWINIAN THEORY.
460 pp. 125 cuts. 2nd edition. Cloth, $2.00.
2. POST-DARWINIAN QUESTIONS.
334 pp. $1.50. Edited by C. Ll. Morgan.

AN EXAMINATION OF WEISMANNISM.
236 pp. Cloth, $1.00. Paper, 35c.

THOUGHTS ON RELIGION.
Edited by Charles Gore, M. A., Canon of Westminster. 184 pp. Third edition. Cloth, gilt top, $1.25.

ERNST MACH.

THE SCIENCE OF MECHANICS. A CRITICAL AND HISTORICAL EXPOSITION OF ITS PRINCIPLES.
Translated by *T. J. McCormack*. 250 illustrations. 518 pp. Half morocco, $2.50.

POPULAR SCIENTIFIC LECTURES.
313 pages. Cloth, gilt top, net $1.00.

THE ANALYSIS OF THE SENSATIONS.
(In preparation.)

ALFRED BINET.

THE PSYCHIC LIFE OF MICRO-ORGANISMS.
Authorised translation. 135 pp. Cl., 75c; paper, 25c.

ON DOUBLE CONSCIOUSNESS.
Studies in Experimental Psychology. 93 pp. 15c.

RICHARD GARBE.

THE REDEMPTION OF THE BRAHMAN. A TALE OF HINDU LIFE.
Laid paper, gilt top. 96 pp. 75c.

TH. RIBOT.

THE PSYCHOLOGY OF ATTENTION.

THE DISEASES OF PERSONALITY.

THE DISEASES OF THE WILL.
Authorised translations. Cl., 75c. each; paper, 25c.
Complete Set, Cloth, $1.75.

EWALD HERING.

ON MEMORY, and THE SPECIFIC ENERGIES OF THE NERVOUS SYSTEM.
Paper, 15c.

C. H. CORNILL.

THE PROPHETS OF ISRAEL. POPULAR SKETCHES FROM OLD TESTAMENT HISTORY.
200 pp. Price, Cloth and Gold, $1.00.

T. A. GOODWIN.

LOVERS THREE THOUSAND YEARS AGO.
Printed on Enfield paper. Pages, 41. Price, 50c.

E. D. COPE,

THE PRIMARY FACTORS OF EVOLUTION.
Pages, 547. Cuts, 121. Price, Cloth, $2.00.

AUGUST WEISMANN.

GERMINAL SELECTION. AS A SOURCE OF DEFINITE VARIATION. Paper, 25c.

LUDWIG NOIRÉ.

ON THE ORIGIN OF LANGUAGE.
Paper, 15c.

M. M. TRUMBULL.

THE FREE TRADE STRUGGLE IN ENGLAND
Second edition. 296 pp. Cloth, 75c; paper, 25c.

WHEELBARROW: ARTICLES AND DISCUSSIONS ON THE LABOR QUESTION.
With portrait of author. 300 pp. Cl., $1.00; pa., 50c.

EARL GREY ON RECIPROCITY AND CIVIL SERVICE REFORM.
With Comments by Gen. M. M. Trumbull. 10c.

GUSTAV FREYTAG.

THE LOST MANUSCRIPT. A NOVEL.
Authorised translation. Two vols., 953 pp. Cloth, gilt top, $4.00. One volume, cloth, $1.00; paper, 75c.

PAUL CARUS.

GOETHE AND SCHILLER'S XENIONS.
Pages, 162. Cloth, 50c.

THE ETHICAL PROBLEM.
Cloth, 50c; paper, 30c.

FUNDAMENTAL PROBLEMS.
Second edition 372 pp. Cloth, $1.50. Paper, 50c.

HOMILIES OF SCIENCE.
310 pp. Cloth, gilt top, $1.50.

THE IDEA OF GOD.
4th edition. 32 pp. Paper, 15c.

THE SOUL OF MAN.
152 cuts and diagrams. 458 pp. Cloth, $3.00.

TRUTH IN FICTION. TWELVE TALES WITH A MORAL.
128 pp. Elegantly bound and printed. Price, $1.00.

THE RELIGION OF SCIENCE.
Extra edition. 103 pp. 50c.

PRIMER OF PHILOSOPHY.
Second edition. 240 pp. Cloth, $1.00.

THE NATURE OF THE STATE.
56 pp. Paper, 15c.

THE GOSPEL OF BUDDHA.
275 pp. 4th ed. Cl., $1.00. Pa., 35c. In German, $1.25.

THE PHILOSOPHY OF THE TOOL.
Pages, 24. Paper, illustrated cover, 10c.

OUR NEED OF PHILOSOPHY.
Pages, 14. Paper, 5c.

SCIENCE A RELIGIOUS REVELATION.
Pages, 21. Paper, 5c.

KARMA. A STORY OF EARLY BUDDHISM.
Japanese edition. Crêpe paper, tied in silk, 75c.

Epitomes of Three Sciences.

1. The Study of Sanskrit. By **H. Oldenberg.**
2. EXPERIMENTAL PSYCHOLOGY. By **J. Jastrow.**
3. The Rise of the People of Israel. By **C. H. Cornill.**
140 pp. Cloth, 75c.

THE OPEN COURT PUBLISHING COMPANY,

324 DEARBORN STREET, CHICAGO, ILL.

THE OPEN COURT

A WEEKLY MAGAZINE

Devoted to the Religion of Science.

Publisher, E. C. HEGELER. *Editor*, DR. PAUL CARUS.

CONTRIBUTORS:

PROF. F. MAX MÜLLER,
PROF. ERNST HAECKEL,
PROF. EWALD HERING,
PROF. ERNST MACH,
PROF. AUGUST WEISMANN,
PROF. WILHELM WUNDT,
PROF. JOSEPH LE CONTE,
ELIZABETH CADY STANTON,
JOHN BURROUGHS,
PROF. GEORGE J. ROMANES,
DR. ALFRED BINET,
WM. M. SALTER,
MONCURE D. CONWAY,
F. M. HOLLAND,
LYMAN J. GAGE,
SUSAN CHANNING,
PROF. E. D. COPE,
TH. RIBOT,
GEN. M. M. TRUMBULL,
DR. FELIX L. OSWALD,
TH. STANTON,
C. S. PEIRCE,
PROF. H. SCHUBERT,
EX-GOVERNOR KOERNER.

THE OPEN COURT is published weekly in eight quarto pages. It contains short ethical sermons, popular expositions of scientific subjects, accurate and authorised translations of important foreign works, discussions of current topics, and reviews of noteworthy scientific investigations. It is the pronounced object of THE OPEN COURT to propagate the Religion of Science, that is, the religion of verified and verifiable truth.

Without assailing the properly religious element of the various religions, it endeavors to preserve of them all that is true and good. Its object, thus, is to aid the efforts of all scientific and progressive people in the churches and out of them, toward greater knowledge of the world in which we live, and the moral and practical duties it requires.

Special Features of The Open Court for the Ensuing Year.

(1) ENGLISH SECULARISM. A Confession of Belief. By *George Jacob Holyoake.*

(2) THE RELIGION OF THE VEDA, AND BUDDHISM. A Study in the History of Religion. By *Prof. Hermann Oldenberg*, Kiel, Germany.

(3) DOCTOR LUTHER. By *Gustav Freytag.*

(4) CHRISTIANITY AND PATRIOTISM. By *Count Leo Tolstoi.*

(5) A PILGRIMAGE TO BEETHOVEN. By *Richard Wagner.*

(6) THE PEDIGREE OF THE DEVIL. By *Dr. Paul Carus.*

(7) AN INTRODUCTION TO THE STUDY OF ETHNOLOGICAL JURISPRUDENCE. By the late *Justice Albert H. Post*, of Bremen, Germany.

Subscription price, post free (United States and all countries in U. P. U.) for twelve months, $1.00. Single copies, 5 cents. Specimen copies free

THE OPEN COURT PUBLISHING COMPANY,
324 DEARBORN STREET, CHICAGO, ILL.

RECENT PUBLICATIONS

THE RECOGNITION OF CUBAN BELLIGERENCY. By *Prof. A. S. Hershey*. An argument in favor of such recognition. Price, 15 cents.

A REVIEW OF BRYCE'S AMERICAN COMMONWEALTH. A Study in American Constitutional Law. By *Prof. Edmund J. James* of Chicago. Price, 25 cents.

THE FORMULATION OF NORMAL LAWS. With special reference to the theory of marginal utility. By *Prof. Simon N. Patten*, University of Pennsylvania. Price, 25 cents.

THE MULTIPLE MONEY STANDARD. By *Prof. J. Allen Smith*. Price, 50 cents.

THE CONSTITUTION OF BELGIUM. Translation with historical introduction and notes. By *Prof. John Martin Vincent* of Johns Hopkins. Price, 50 cents.

POLITICAL AND MUNICIPAL LEGISLATION IN 1895. By *Mr. E. Dana Durand*. Price, 15 cents.

INDIVIDUAL DETERMINISM AND SOCIAL SCIENCE. By *G. Fiamingo*, Rome. Price, 15 cents.

New and complete list of publications on application.

AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE.

STATION B, PHILADELPHIA, PA.

THE CALCUTTA REVIEW

A QUARTERLY MAGAZINE,

EDITED BY JAMES W. FURRELL.

CONTENTS FOR JANUARY, 1896.

The Rhythm of Tennyson. By W. Trego Webb.

Recollections of an Indian Civilian. By H. G. Keene, C.I.E., M.A., Oxon.

The Isolation of Karachi, an Imperial Mistake. By F. C. Constable, M. A.

Notes from the Calcutta Zoological Gardens. By Sarat Chandra Mitra, M. A., B. L.

The Cival Law of Italy. By H. A. D. Phillips, C. S.

Bengal: Its Castes and Curses. *(Independent Section. Concluded from No. CCII, October, 1895.)*

Deussen's Vedanta. Translated by Charles Johnston, B.C.S. (*Retd.*), M.R.A.S.

Sanitation in Bengal Jails. By W. H. Gregg, *Brig. Surg. Lt. Col., Dip. Pub. Health, Camb.*

The Quarter.

Critical Notices.—General Literature. Vernacular Literature. Acknowledgments. Etc.

Orders now being registered for Second Series "Selections" from

The Calcutta Review

In monthly Parts of 120 pages, uniform with First Series, bringing the "SELECTIONS" from No. 101 up to 200. Subscription Rs. 15 per annum in advance.

As only a limited number will be struck off, early application is necessary to prevent disappointment.

For full Prospectus and Table of Contents, apply to the CITY PRESS, 12, Bentinck Street Calcutta, or to any European Bookseller.

N. B.—A few sets of the First Series, comprising XI Vols., half bound in roan Morocco are available to Subscribers to the Second Series at 25 per cent. off the reduced price, Rs. 60.

CALCUTTA:

THOMAS S. SMITH, CITY PRESS, 12, BENTINCK STREET.

LONDON:

MESSRS. KEGAN PAUL, TRENCH, TRÜBNER, & CO., 57 LUDGATE HILL.

SUBSCRIPTION PER ANNUM { INDIA, Rs. 17 inclusive postage. EUROPE, £1-4s., or each No. 6s. U. S. A., $6.00 per year, single numbers $1.50.

The Psychological Review.

EDITED BY

J. MARK BALDWIN, PRINCETON UNIVERSITY AND **J. McKEEN CATTELL**, COLUMBIA COLLEGE

WITH THE CO-OPERATION OF

ALFRED BINET, ECOLE DES HAUTES-ETUDES, PARIS; JOHN DEWEY, UNIVERSITY OF MICHIGAN; H. H. DONALDSON, UNIVERSITY OF CHICAGO; G. S. FULLERTON, UNIVERSITY OF PENNSYLVANIA; WILLIAM JAMES, HARVARD UNIVERSITY; JOSEPH JASTROW, UNIVERSITY OF WISCONSIN; G. T. LADD, YALE UNIVERSITY; HUGO MUENSTERBERG, HARVARD UNIVERSITY; M. ALLEN STARR, COLLEGE OF PHYSICIANS AND SURGEONS, NEW YORK; CARL STUMPF, UNIVERSITY, BERLIN; and JAMES SULLY, UNIVERSITY COLLEGE, LONDON.

FROM THE CONTENTS OF VOLUME II., 1895:

(Six Nos., 650 pages, with one *Monograph Supplement* of 88 pages, and a Bibliography for 1894, called the *Psychological Index* of 81 pages.)

Hermann von Helmholtz and the New Psychology: C. STUMPF.
The Significance of Emotions: JOHN DEWEY.
The Muscular Sense and Its Locatiou in the Brain Cortex: M. ALLEN STARR.
A Location Reaction Apparatus: G. W. FITZ.
The Knowing of Things Together: WILLIAM JAMES.
Contributions from the Psychological Laboratory of Columbia College: HAROLD GRIFFING, S. I. FRANZ.
Normal Defects of Vision in the Fovea: CHRISTINE LADD FRANKLIN.
Proceedings of the Third Annual Meeting of the American Psychological Association, Princeton, 1894.
Preliminary Report on Imitation: JOSIAH ROYCE.
Studies from the Princeton Laboratory (I–V): J. MARK BALDWIN, W. J. SHAW, H. C. WARREN.
The 'Haunted Swing' Illusion: H. C. WOOD.
Heat-Sensations in the Teeth: H. R. MARSHALL.
The Psychology of Pain: C. A. STRONG.
Experimental Induction of Automatic Processes: W. R. NEWBOLD.
Wellesley College Psychological Studies: MARY W. CALKINS.
Sensory Stimulation by Attention: J. G. Hibben.
Some Observations on the Anomalies of Self-Consciousness: JOSIAH ROYCE.
On Dreaming of the Dead: HAVELOCK ELLIS.
Emotion, Desire, and Interest: Descriptive: S. F. MCLENNAN.
Reaction Time According to Race: R. MEADE BACHE.
The Confusion of Function and Content in Mental Analysis: D. S. MILLER.
The Origin of a 'Thing' and Its Nature: J. MARK BALDWIN.
The Perception of Two Points Not the Space-Threshold: GUY TAWNEY.
Discussion, Psychological Literature, Notes, etc.

Subscription (Six Numbers, bimonthly, Supplements and Bibliography for 1895), $4.00. Single Numbers, 75 Cents. *Vol. III. begins January 1, 1896.*

PUBLISHED BI-MONTHLY BY

MACMILLAN AND CO.,

66 FIFTH AVENUE, NEW YORK; AND LONDON.

REVUE PHILOSOPHIQUE

DE LA FRANCE ET DE L'ÉTRANGER.

Dirigée par TH. RIBOT,

PROFESSEUR AU COLLÈGE DE FRANCE.

(21e année, 1896.)

La REVUE PHILOSOPHIQUE paraît tous les mois, par livraisons de 7 feuilles grand in-8, et forme ainsi à la fin de chaque année deux forts volumes d'environ 680 pages chacun.

CHAQUE NUMÉRO DE LA *Revue* CONTIENT :

1° Plusieurs articles de fond ; 2° des analyses et comptes rendus des nouveaux ouvrages philosophiques français et étrangers ; 3° un compte rendu aussi complet que possible des *publications périodiques* de l'étranger pour tout ce qui concerne la philosophie ; 4° des notes, documents, observations, pouvant servir de matériaux ou donner lieu à des vues nouvelles.

Prix d'abonnement :

Un an, pour Paris, 30 fr. — Pour les départements et l'étranger, 33 fr.
La livraison..... 3 fr.
Les années écoulées se vendent séparément 30 francs, et par livraisons de 3 francs.

TABLE GÉNÉRALE DES MATIÈRES contenues dans les 12 premières années (1876–1887), par M. BÉLUGOU. 1 vol. in-8..... 3 fr.

On s'abonne sans frais :

Chez FÉLIX ALCAN, éditeur, 108, boulevard Saint-Germain à Paris ; chez tous les libraires de la France et de l'étranger, et dans tous les bureaux de poste de France et de l'Union postale.

THE OBSERVER

FOR 1896

Enlarged and Improved

PEOPLE of Refinement and Good Taste with a love of the true and beautiful, especially in the wonders and beauties of Nature, cannot fail to appreciate this monthly magazine of the outdoor world. Its mission is to love and learn Birds, Insects, Plants, Flowers, Ferns, Mosses, Stars, Planets, Minerals, the Marvels of Minute Life in the Ponds and Ditches, etc. Is valued by those who enjoy roaming over the hills, across the open fields, along the picturesque highways, or through "Nature's temples," the woods; or those who have, or expect to have a microscope.

Subscription: One Year, $1.
Send Ten Cents for Sample Copy.

E. F. BIGELOW, Publisher,
PORTLAND, CONNECTICUT.

A Thousand Pages of the Freshest Thought on Biblical Subjects for Two Dollars

THE BIBLICAL WORLD

is the only American journal devoted exclusively to the study of the Bible. Its platform is that of progressive, constructive knowledge of the Scriptures. It is believed that the best that can be known and discovered about the Bible, the best methods and the best scholarship, are none too good for the people and should be given to the people as fully and as speedily as possible. The Biblical World is therefore a popular journal, intended to aid the busy minister, the Sunday-school teacher, the intelligent layman, all earnest students of the Scriptures.

During the year 1896 the most eminent biblical scholars and writers of Europe and America will contribute to its pages. It will also be made more interesting and valuable by the addition of illustrations; and portraits of distinguished scholars, reproductions of ancient monuments, famous pictures of Bible scenes and characters, and representations of biblical sites, will form a most attractive feature.

The "Christ" Number.

The December, 1895, issue will be specially devoted to the life and work of Christ. It will be nearly double the size of the regular issues, printed on the best of enameled book paper, and will contain many fine illustrations in half-tones. These pictures will be reproductions of famous paintings and drawings of the Christ and of the scenes of his childhood and later life. This number will be made still more attractive by a specially designed cover; and it is the purpose of the publishers to make it one of the most interesting and beautiful of the books of the Holiday season, as well as one of the most useful in outlining the life of the Christ and the salient features of his work, and its influence through the centuries since he lived on earth.

The contents of this number, which will best illustrate its scope and value, will be as follows:

The Foreshadowings of Christ,	Prof. W. R. Harper
The Times of Christ,	Rev. Prof. H. W. Scott, D. D.
The Original Text of the Gospels,	Rev. Prof. Casper Rene Gregory
The Sources of Information for the Life of Christ,	Prof. E. D. Burton
The Birth and Childhood of Christ,	Rev. Prof. A. C. Zenos
The Ministry of Christ,	Rev. Prof. Geo. B. Stevens, D.D.
The Teachings of Christ in the Gospels of Matthew, Mark, and Luke,	Rev. Prof. A. B. Bruce
The Teachings of Christ in the Gospel of John,	Rev. Prof. Marcus Dods
The Methods of Christ's Preaching,	Rev. Prof. W. C. Wilkinson
The Christ in Art,	Rev. Prof. Rush Rhees
The Christ in Song,	Rev. F. W. Gunsaulus
The Christ in History,	Principal A. M. Fairbairn
Helps for the Study of the Life of Christ	Prof. Shailer Mathews
Outlines of Important Articles Relating to Christ	Prof. C. W. Votaw
The Hall of the Christ at Chautauqua,	Bishop John H. Vincent

The subscription price of The Biblical World is $2 a year, payable in advance, for the United States, Canada, and Mexico, and $2.50 a year for foreign addresses.

To new subscribers for 1896, the beautiful "Christ" number will be sent free.

All remittances should be made payable to the order of The University of Chicago.

Address:

THE UNIVERSITY OF CHICAGO,

UNIVERSITY PRESS DIVISION, CHICAGO, ILLINOIS.

$4.00 per Year. $4.60 per Year (Foreign). 35 cts. per Copy.

THE AMERICAN NATURALIST

A MONTHLY JOURNAL DEVOTED TO THE NATURAL SCIENCES IN THEIR WIDEST SENSE.

1867. 30TH YEAR. 1896.

MANAGING EDITORS:

PROFESSORS E. D. COPE, PHILADELPHIA, PA., and J. S. KINGSLEY, BOSTON, MASS.

ASSOCIATE EDITORS:

PROF. W. S. BAYLEY, of Colby University, Waterville, Me., Dept. of Petrography.
PROF. W. H. HOBBS, Madison, Wisc., Dept. of Mineralogy.
DR. C. E. BESSEY, of The University of Nebraska, Lincoln, Neb., Dept. of Botany.
DR. ERWIN F. SMITH, Washington, D. C., Dept. of Vegetable Physiology.
PROF. C. M. WEED, of College of New Hampshire, Durham, N. H., Dept. of Entomology.
PROF. W. ROMAINE NEWBOLD, University of Pennsylvania, Dept. of Psychology.
PROF. E. A. ANDREWS, of Johns Hopkins University, Baltimore, Md., Dept. of Embryology
H. C. MERCER, of the University of Pennsylvania, Dept. of Anthropology.
DR. C. O. WHITMAN, of Chicago University, Chicago, Ill., Dept. of Microscopic Technique.

THE EDWARDS & DOCKER CO.,

518 AND 520 MINOR STREET. PHILADELPHIA, U. S. A.

Advertising Rates will be furnished upon application.

Sample Copies 15 cents.

SCIENCE.

A WEEKLY JOURNAL

DEVOTED TO THE ADVANCEMENT OF SCIENCE.

EDITORIAL COMMITTEE: *S. Newcomb*, Mathematics; *R. S. Woodward*, Mechanics; *E. C. Pickering*, Astronomy; *T. C. Mendenhall*, Physics; *R. H. Thurston*, Engineering; *Ira Remsen*, Chemistry; *J. Le Conte*, Geology; *W. M. Davis*, Physiography; *O. C. Marsh*, Paleontology; *W. K. Brooks*, Invertebrate Zoölogy; *C. Hart Merriam*, Vertebrate Zoölogy; *S. H. Scudder*, Entomology; *N. L. Britton*, Botany; *Henry F. Osborn*, General Biology; *H. P. Bowditch*, Physiology; *J. S. Billings*, Hygiene; *J. McKeen Cattell*, Psychology; *Daniel G. Brinton*, *J. W. Powell*, Anthropology.

The publication of a new series of *Science* (established 1883) was begun in January, 1895. The journal is now edited by a committee composed of the leading men of science in America. This committee guarantees an adequate and authoritative treatment of each science and of all questions concerning science as a whole. The journal is essential to all who wish to keep informed of the progress of science.

Subscriptions (five dollars annually, single copies fifteen cents) should be addressed to:

SCIENCE, 41 East 49th St., New York.

VOLUME III NUMBER 6

THE PHYSICAL REVIEW

A JOURNAL OF EXPERIMENTAL AND THEORETICAL PHYSICS

CONDUCTED BY

EDWARD L. NICHOLS, ERNEST MERRITT, and FREDERICK BEDELL

XVIII

MAY–JUNE 1896

Table of Contents

SOLIDS AND VAPORS . *Wilder D. Bancroft* 401

ON THE HEAT EFFECT OF MIXING LIQUIDS *C. E. Linebarger* 418

THE INFLUENCE OF HEAT, OF THE ELECTRIC CURRENT, AND OF MAGNETISM UPON YOUNG'S MODULUS *Mary Chilton Noyes* 432

A PHOTOGRAPHIC STUDY OF THE ARC SPECTRA. II. *Caroline W. Baldwin* 448

MINOR CONTRIBUTIONS: (1) A Method for the Use of Standard Candles. *C. H. Sharp.* (2) The Graphical Representation of Magnetic Theories. *H. N. Allen.* (3) On the Alternating Current Dynamo. *W. E. Goldsborough* 458

NEW BOOKS: *Roscoe* and *Harden*: A New View of Dalton's Atomic Theory; *Loudon* and *McLennan*: A Laboratory Course in Experimental Physics; *Ball:* A Primer of the History of Mathematics; *Bedell* and *Crehore:* Étude Analytique et Graphique des Courants Alternatifs; Theorie der Wechselströme in analytischer und graphischer Darstellung; *Holman:* Computation Rules and Logarithms, with Tables of Other Useful Functions; *Hornby:* A Textbook of Gas Manufacture 483

COPYRIGHT, 1896, BY MACMILLAN & CO.

PUBLISHED FOR CORNELL UNIVERSITY.

MACMILLAN AND COMPANY

NEW YORK LONDON

BERLIN: MAYER AND MUELLER

VOLUME IV NUMBER 1

THE ASTROPHYSICAL JOURNAL

An International Review of Spectroscopy and Astronomical Physics

JUNE-JULY 1896

EDITORS

GEORGE E. HALE
Director of the Yerkes Observatory

JAMES E. KEELER
Director of the Allegheny Observatory

ASSISTANT EDITORS

J. S. AMES
Johns Hopkins University

HENRY CREW
Northwestern University

W. W. CAMPBELL
Lick Observatory

E. B. FROST
Dartmouth College

F. L. O. WADSWORTH, Yerkes Observatory

ASSOCIATE EDITORS

M. A. CORNU
Ecole Polytechnique, Paris

C. S. HASTINGS
Yale University

N. C. DUNÉR
Astronomiska Observatorium, Upsala

A. A. MICHELSON
University of Chicago

WILLIAM HUGGINS
Tulse Hill Observatory, London

E. C. PICKERING
Harvard College Observatory

P. TACCHINI
Osservatorio del Collegio Romano, Rome

H. A. ROWLAND
Johns Hopkins University

H. C. VOGEL
Astrophysikalisches Observatorium, Potsdam

C. A. YOUNG
Princeton University

CONTENTS

ON THE SPECTRA OF ARGON.....H. KAYSER 1

A NEW POINT OF VIEW FOR REGARDING SOLAR PHENOMENA, AND A NEW EXPLANATION OF THE APPEARANCES ON THE SURFACE OF THE SUN.....J. FENYI 18

FURTHER CONSIDERATIONS IN REGARD TO LAWS OF RADIATION.....FRANK W. VERY 38

THE SPECTROSCOPE OF THE EMERSON McMILLIN OBSERVATORY.....H. C. LORD 50

THE MODERN SPECTROSCOPE. XIX. THE OBJECTIVE SPECTROSCOPE. GEORGE E. HALE and F. L. O. WADSWORTH 54

MINOR CONTRIBUTIONS AND NOTES:

On Mr. Jewell's Observations of the Spectrum of Mars; W. W. CAMPBELL, 79. *Carl Nicolaus Adalbert Krueger,* 80. *The Total Eclipse of the Sun, April 16, 1893; Report and Discussion of the Observations Relating to Solar Physics;* J. NORMAN LOCKYER, 81. *A New Firm of Instrument Makers,* 83.

RECENT PUBLICATIONS..... 85-89

CHICAGO
THE UNIVERSITY OF CHICAGO PRESS

WILLIAM WESLEY & SON, 28 Essex St., Strand, London
Sole Foreign Agents

SUBSCRIPTION, FOUR DOLLARS. SINGLE NUMBERS, FIFTY CENTS

THE MONIST.

NOTABLE ARTICLES CONTINUED.

VOLUME III., NO. 2.

THE DOCTRINE OF AUTA - - - - - - - - - - PROF. C. LLOYD MORGAN
EVOLUTIONARY LOVE - - - - - - - - - - - CHARLES S. PEIRCE
CRUELTY AND PITY IN WOMAN - - - - - - - - GUILLAUME FERRERO

VOLUME III., NO. 3.

RELIGION AND MODERN SCIENCE - - - - - - - - - - PROF. F. JODL
THE FOURTH DIMENSION - - - - - - - - PROF. HERMANN SCHUBERT

VOLUME III., NO. 4.

REPLY TO THE NECESSITARIANS - - - - - - - - - CHARLES S. PEIRCE
THE FOUNDATIONS OF THEISM - - - - - - - - - - PROF. E. D. COPE

VOLUME IV., NO. 1.

THE PRESENT STATE OF MATHEMATICS - - - - - - - - PROF. FELIX KLEIN
CORRELATION OF MENTAL AND PHYSICAL POWERS - - - - - - - - - J. VENN
DR. WEISMANN ON HEREDITY AND PROGRESS - - - - - PROF. C. LLOYD MORGAN
THE NERVOUS CENTRE OF FLIGHT IN COLEOPTERA - - - - - - DR. ALFRED BINET

VOLUME IV., NO. 2.

THE UNIVERSALITY OF TRUTH - - - - - - - THE RIGHT REV. SHAKU SOYEN
THE FUNDAMENTAL TEACHINGS OF BUDDHISM - - - - THE REV. ZITSUZEN ASHITZU
ON THE CONNEXION BETWEEN INDIAN AND GREEK PHILOSOPHY - PROF. RICHARD GARBE
A MONISTIC THEORY OF MIND - - - - - - - - - - LESTER F. WARD
ARE THE DIMENSIONS OF THE PHYSICAL WORLD ABSOLUTE? - - - - PROF. J. DELBŒUF
THE PROBLEM OF WOMAN, FROM A BIO-SOCIOLOGICAL POINT OF VIEW - - G. FERRERO

VOLUME IV., NO. 3.

THREE ASPECTS OF MONISM - - - - - - - - - - PROF. C. LLOYD MORGAN
THE PARLIAMENT OF RELIGIONS - - - - - - - - - GEN. M. M. TRUMBULL
MODERN PHYSIOLOGY - - - - - - - - - - - PROF. MAX VERWORN
NOTION AND DEFINITION OF NUMBER - - - - - - - PROF. HERMANN SCHUBERT

VOLUME IV., NO. 4.

LEONARDO DA VINCI AS A PIONEER IN SCIENCE - - - - - - WILLIAM R. THAYER
MONISM IN ARITHMETIC - - - - - - - - - PROF. HERMANN SCHUBERT
OUTLINES OF A HISTORY OF INDIAN PHILOSOPHY - - - - - PROF. RICHARD GARBE

VOLUME V., NO. 1.

ON THE PRINCIPLE OF THE CONSERVATION OF ENERGY - - - - - PROF. ERNST MACH
BUDDHISM AND CHRISTIANITY - - - - - - - - - - - DR. PAUL CARUS

VOLUME V., NO. 2.

LONGEVITY AND DEATH. (A Posthumous Essay.) - - - GEORGE J. ROMANES, F.R.S.
TO BE ALIVE, WHAT IS IT? - - - - - - - - - DR. EDMUND MONTGOMERY
THE ADVANCEMENT OF ETHICS - - - - - - - - - DR. FRANCIS E. ABBOT

VOLUME V., NO. 3.

THE WORLD'S PARLIAMENT OF RELIGIONS - - - - - - - HON. C. C. BONNEY
BONNET'S THEORY OF EVOLUTION - - - - - - - - PROF. C. O. WHITMAN

VOLUME V., NO. 4.

THE THEORY OF EVOLUTION AND SOCIAL PROGRESS - - PROF. JOSEPH LE CONTE
THE METAPHYSICAL χ IN COGNITION - - - - - - - - - DR. PAUL CARUS
THE UNSEEN UNIVERSE - - - - - - - - - SIR ROBERT STAWELL BALL

VOLUME VI., NO. 1.

THE DARWINISM OF DARWIN, AND OF THE POST-DARWINIAN SCHOOLS G. J. ROMANES, F.R.S.
SCIENCE AND FAITH - - - - - - - - - - - - DR. PAUL TOPINARD
CRIMINAL ANTHROPOLOGY APPLIED TO PEDAGOGY - - - PROF. CESARE LOMBROSO
ARRESTED MENTATION - - - - - - - - - - - - - G. FERRERO
NATURALISM - - - - - - - - - - - - PROF. C. LLOYD MORGAN
THE FIFTH GOSPEL - - - - - - - - - - - DR. WOODS HUTCHINSON

VOLUME VI., NO. 2.

ON THE PART PLAYED BY ACCIDENT IN INVENTION AND DISCOVERY - - PROF. ERNST MACH
PATHOLOGICAL PLEASURES AND PAINS - - - - - - - - - PROF. TH. RIBOT
CHINESE PHILOSOPHY - - - - - - - - - - - - DR. PAUL CARUS
GERMINAL SELECTION - - - - - - - - - PROF. AUGUST WEISMANN

"*The Religion of Science Library* is the best solid line of books in inexpensive editions now publishing in this country."—*The Book and Newsdealer.*

The Religion of Science Library.

A Collection of standard works of The Open Court Press, issued bimonthly. Yearly, $1.50; single numbers, 15, 25, 35, and 50 cents, according to size. The books are printed on good paper, from large type.

The Religion of Science Library, by its extraordinarily reasonable price, will bring a number of important books within reach of all readers.

The following have already appeared in the series:

No. 1. **The Religion of Science.** By PAUL CARUS. 25 cents.
2. **Three Introductory Lectures on the Science of Thought.** By F. MAX MÜLLER. 25 cents.
3. **Three Lectures on the Science of Language.** By F. MAX MÜLLER. 25 cents.
4. **The Diseases of Personality.** By TH. RIBOT. 25 cents.
5. **The Psychology of Attention.** By TH. RIBOT. 25 cents.
6. **The Psychic Life of Micro-Organisms.** By ALFRED BINET. 25 cents.
7. **The Nature of the State.** By PAUL CARUS. 15 cents.
8. **On Double Consciousness.** By ALFRED BINET. 15 cents.
9. **Fundamental Problems.** By PAUL CARUS. Pages, 373. 50 cents.
10. **The Diseases of the Will.** By TH. RIBOT. 25 cents.
11. **The Origin of Language,** and **The Logos Theory.** By LUDWIG NOIRÉ. 15 cents.
12. **The Free Trade Struggle in England.** By GEN. M. M. TRUMBULL. 25 cents.
13. **Wheelbarrow on the Labor Question.** 35 cents.
14. **The Gospel of Buddha.** By PAUL CARUS. 35 cents.
15. **Primer of Philosophy.** By PAUL CARUS. 25 cents.
16. **On Memory,** and **The Specific Energies of the Nervous System.** By PROF. EWALD HERING. 15 cents.
17. **The Redemption of the Brahman.** A Novel. By R. GARBE. 25 cents.
18. **An Examination of Weismannism.** By G. J. ROMANES. 35 cents.
19. **On Germinal Selection.** By AUGUST WEISMANN. 25 cents.
20. **Lovers Three Thousand Years Ago.** By T. A. GOODWIN. 15 cents.

The following are in preparation: *The Philosophy of Ancient India,* by Prof. Richard Garbe. *Buddhism and Christianity,* by Dr. Paul Carus. *The Lost Manuscript,* a novel, by Gustav Freytag. *The Study of Sanskrit,* by Prof. H. Oldenberg. *Old Testament History,* by Prof. C. H. Cornill.

THE OPEN COURT PUBLISHING COMPANY,

324 DEARBORN ST., CHICAGO, ILL.

LONDON: 17 JOHNSON'S COURT, FLEET ST., E. C.